

Issue 4: The value of X-rays for following Rheumatoid Arthritis

X-rays in RA

X-ray examination has been a time-honoured, relatively inexpensive and feasible method for evaluating joint pathology. [1] Radiographic scoring methods can provide a measure of joint damage in rheumatoid arthritis (RA), and radiographic progression is considered an important outcome variable in clinical trials and observational studies involving patients with RA. [2, 3] Radiography may also help in differentiation from other joint diseases when criteria are not conclusive for a diagnosis of RA. On the other hand, radiography has limitations in evaluating disease progression, and its routine use may not be warranted for all patients with RA. [1, 3] The time course of disease progression is not linear, and joint involvement is not uniform. There is no general consensus on which joints to image. [4] In addition, the largest predictor of RA joint damage on X-rays is the presence of current damage. That is to say that erosions may increase in size or are very predictive of future erosions. CRP and RF and CCP status and ESR may all also predict joint damage in RA. X-rays are also a necessary prerequisite for patients being considered for surgical intervention.



The pros and cons of radiographic examination for the evaluation of RA disease progression in clinical practice are discussed below.

Pros

Several biologic and non-biologic therapies are available for managing RA. Non-biologic agents include conventional disease modifying antirheumatic drugs (DMARDs) such as hydroxychloroquine, leflunomide, methotrexate, and sulfasalazine. Biologic therapies include abatacept, adalimumab, anakinra, certolizumab, etanercept, golimumab, infliximab, rituximab and tocilizumab.

Feasibility: Widely available, relatively inexpensive and can be easily performed.

Provides a measure of damage: Radiographic scoring methods such as the Sharp and Larsen methods can provide a measure of damage. [2] However, X-rays are not scored routinely in any radiology reports and thus a visual comparison over time of progression vs. no progression can be reported by the radiologist and /or quickly compared by the rheumatologist. There is a published scoring system of a few key hand joints that is feasible for rheumatologists if they want an actual score. It has been compared to more time consuming traditional scoring. [6]

Aids in therapeutic decision making: Therapeutic decisions can be made based on X-ray findings. New radiographic changes would suggest a need to review the therapeutic regimen, especially if the changes are found at a time when no modification to the treatment was being planned.

Cons

Lag time: Most patients do not progress in a short period of time. Radiographs change slowly in most people with RA,

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Faculty:

Dr Janet Pope, M.D.,

Patient profile: What would you do?

Mrs. Smith, a 54-year old woman working as an administrative assistant, has a history of rheumatoid arthritis (RA) for the last 4 years. She is receiving treatment with sulfasalazine, methotrexate and celecoxib. She now has 4 swollen and tender joints, and has developed subluxation of her right second metatarsophalangeal joint. Her inflammatory markers, i.e., erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), are constantly elevated.

[Should she get an X-ray at this time?](#)

Ten years later, at the age of 64 years, Mrs. Smith is happily retired. For the last 3 years, she has had no swollen and tender joints. Her ESR and CRP are normal. She has been maintained on combination DMARDs for the last several years without side effects.

[Do you think an X-ray should be done now?](#)

Ms Smith is now 66 years old. Off and on, she experiences flares of RA. Her second, third and fourth metatarsophalangeal joints on both sides are tender but not swollen. Her ESR and CRP, tested 3-monthly, are in the normal range.



and structural change is not reliably determined in less than 6-12 months. Thus radiography may only show late signs of preceding disease activity and the resulting joint damage.^[3] For instance, now even in trials of very active RA with treatment of placebo compared to an active comparator, only a few outliers (ie less than 15%) drive the mean change in X-rays but the median change over 6 to 24

months is often 0.

Correlation with severe outcomes: Radiographs correlate significantly with rheumatoid factor, anti-CCP and C-reactive protein and sedimentation rate, and less so with patient joint tenderness and pain. Structural damage as assessed on plain X-rays can be an indicator of poor function. However, X-rays are relatively weak predictors of severe outcomes, such as work disability, costs and premature mortality than measures of functional status on patient self-report questionnaires.^[2, 5]

Influence on treatment in active disease: The treatment target in RA is to achieve complete remission. Therefore, patients with active disease would require treatment irrespective of X-ray findings.

Interpretation: Scoring of radiographs, e.g., the Sharp and the Larsen methods, can provide a measure of damage in RA.^[2] However, this requires experienced readers, and reader variation can adversely affect scoring. In practice, most radiologists do not actually score radiographs of patients with RA.

Projectional superimposition: X-rays provide two-dimensional images that may obscure erosions and mimic cartilage loss so changes can be missed (under reported) and conversely there can be over interpretation of cystic changes that are reported as erosions.^[3]

Exposure to radiation: The harmful effects of unnecessary exposure to ionising radiation are recognized but X-rays have far less radiation than a CT scan. However, if serial X-rays are not compared then their utility is low. Radiologists tend not to compare or formally read small changes over time so the rheumatologist must be committed to interpret the changes by reading the films.

In general, for any test that is ordered in routine practice, it is worthwhile to think of Bayesian theory: if the test will not alter what you are going to do, then don't order it. If you are certain you will or will not change treatment within a patient, then X-rays do not add value for that decision but if you are uncertain (ex probability of changing therapy is between 30% to 70%), then an Xray may help to improve the probability to one extreme or the other.

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[Would an X-ray be of use now?](#)

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