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# Major differences in medical and surgical treatment of psoriatic arthritis and rheumatoid arthritis: a comparison of two historic cohorts

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**Objectives**: Substantial changes in the handling of patients with inflammatory arthritis have occurred during the past half century. Polyarticular psoriatic arthritis (PsA) has been treated with the same synthetic disease-modifying anti-rheumatic drugs (DMARDs) as rheumatoid arthritis (RA), but for PsA there is less documentation regarding their effect. For biologic DMARDs, evidence of effect is more convincing. We have previously investigated the risk of orthopaedic surgery in patients with RA and PsA to see whether the change in treatment over time has improved the long-term outcome of inflammatory arthritis. For RA, patients diagnosed from 1999 onwards had a lower risk of surgery than patients diagnosed in earlier years. For PsA, the risk of surgery did not change similarly. We wished to compare RA patients to PsA patients with regard to medical and surgical treatment.
**Method**: We compared a historic cohort of 1010 RA patients diagnosed in 1972–2009 to a historic cohort of 590 PsA patients diagnosed in 1954–2011.
**Results**: PsA patients received significantly less medical treatment both in the first year of disease and during the disease course. Risk of surgery during the disease course was lower for PsA than for RA (20% vs 31%). The risk of surgery in RA patients diagnosed from 1999 onwards was similar to that of PsA patients.
**Conclusions**: PsA patients received less intensive treatment than RA patients. Their prognosis, regarding orthopaedic surgery, was also less severe. Contrary to RA, the change in treatment did not have beneficial effects regarding the risk of orthopaedic surgery.

Methotrexate was introduced in the late 1970s, and around 1986 became part of the treatment for rheumatoid arthritis (RA) and psoriatic arthritis (PsA) in Norway. Alone or in combination with other synthetic disease-modifying anti-rheumatic drugs (DMARDs), methotrexate has, over the years, assumed a dominant role in the treatment strategy for RA, and has been prescribed increasingly early, and in higher doses, to achieve adequate disease control. In 1999, treatment further improved with the introduction of tumour necrosis factor-α (TNF-α) inhibitors, which were the first of many biologic DMARDs to become available to patients for whom the synthetic DMARDs are insufficient.

Polyarticular PsA has largely been treated with the same synthetic DMARDs as RA, but for PsA there is less documentation regarding their effect (1). For biologic DMARDs, however, evidence of effect is more convincing (2).

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Significant changes in the handling of patients with inflammatory arthritis have occurred over the past five decades. There has been an increasing use of biologic and synthetic DMARDs in the treatment of RA, and although not to the same extent, this also holds for PsA (3). A 2019 publication showed that patients with RA and PsA share similar patterns of healthcare resource utilization (4).

In 2004, a study showing the effect on RA patients of intensive step-up treatment towards a predetermined goal, and how this lowered disease activity and slowed radiographic progression, was published (5). Treat-to-target (T2T) is now a mainstay of modern RA treatment. A similar approach has been suggested for PsA, but, partly because of the heterogeneity of PsA, a suitable disease activity measure and treatment target have not yet been agreed upon. Until the publication of the Tight Control of Inflammation in Early Psoriatic Arthritis (TICOPA) trial in 2015, there were few studies on T2T in this patient group. Coates et al found that tight control of PsA disease activity significantly improved joint outcomes for newly diagnosed patients (6), although at a greater economic cost and without any influence on radiographic progression.


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PsA is part of the spondyloarthritis (SpA) group. When investigating the synovium and synovial fluid in RA and SpA, several studies have found differences regarding the cellularity, vascularity, morphology of vessels, and the presence of cytokines (7, 8). This may explain why the effect of treatment can differ between the diseases.

Orthopaedic surgery is an important outcome measure in inflammatory rheumatic joint disease, and gives an objective measure of inflammation not sufficiently handled by medical treatment. To see whether improved treatment had affected the long-term outcome of inflammatory joint disease, we have previously reported the occurrence of orthopaedic surgery in RA and PsA (9, 10). We found that 31% of RA patients and 20% of PsA patients needed surgery during the disease course. For RA, patients diagnosed before 1986 and in 1986–1998 had an increased risk of surgery [relative risk (RR) 2.4 and 2.2, respectively, $p < 0.001$], compared to patients diagnosed from 1999 onwards. For PsA patients we found no decline over time in the risk of orthopaedic surgery. In both RA (9) and PsA (10) patients, we found that the intensity of treatment increased over the years.

This study aimed to compare RA and PsA patients by means of medical treatment received and the frequency of orthopaedic surgery, as well as time trends relating to this outcome.

## Method

We reviewed the medical history of 1010 patients with RA and 590 patients with PsA treated at Haukeland University Hospital, as previously described (9, 10). We compared the use of synthetic and biologic DMARDs in the two patient groups, and the occurrence of orthopaedic surgery, and analysed the differences using the chi-squared test. We used the t-test for continuous variables. Kaplan–Meier curves, using the log-rank test for significance, were constructed to illustrate the risk of surgery for the two diagnoses in three different subgroups: patients diagnosed in the pre-methotrexate era (before 1986), patients diagnosed in the years where methotrexate was available at the time of diagnosis (1986–1998), and patients diagnosed after both methotrexate and biologic treatment were available (1999–2009/11).

Ethics approval was obtained (2014/1923 and 2016/2207/REK West). Patients gave written informed consent to publication.

## Results

PsA patients consistently received less treatment than RA patients did. A comparison of the use of methotrexate and biologic drugs is presented in Table 1.

A higher percentage of RA patients underwent surgery. The number and type of surgical procedures in the two cohorts are presented in Table 2. The cumulative percentage undergoing operations among RA and PsA patients in each of the three time periods (before 1986, 1986–1998, and 1999–2009/11) is presented in Figure 1. There was a significant difference in the risk of surgery between RA and PsA patients diagnosed before 1986 ($p < 0.001$) and diagnosed in 1986–1998 ($p < 0.001$), but none when comparing RA and PsA patients diagnosed from 1999 onwards ($p = 0.19$).

Table 1. Comparative analysis of medication used in the first year and during the disease course for rheumatoid arthritis (RA) and psoriatic arthritis (PsA) in total and in the three different treatment eras, given in per cent within each patient group.

| | | RA | PsA | p |
|---|---|---|---|---|
| Total | n | 1010 | 590 | |
| | Methotrexate first year | 43 | 30 | < 0.001 |
| | Methotrexate during disease course | 73 | 56 | < 0.001 |
| | Biologic first year | 4.5 | 4.7 | 0.79 |
| | Biologic during disease course | 30 | 25 | 0.021 |
| < 1986 | n | 154 | 72 | |
| | Methotrexate first year | 0 | 4.2* | 0.011 |
| | Methotrexate during disease course | 54 | 36 | 0.013 |
| | Biologic first year | | | |
| | Biologic during disease course | 11 | 15 | 0.37 |
| 1986–1998 | n | 315 | 196 | |
| | Methotrexate first year | 25 | 17 | 0.023 |
| | Methotrexate during disease course | 71 | 42 | < 0.001 |
| | Biologic first year | | | |
| | Biologic during disease course | 29 | 10 | < 0.001 |
| 1999–2009/11 | n | 541 | 322 | |
| | Methotrexate first year | 65 | 43 | < 0.001 |
| | Methotrexate during disease course | 81 | 68 | < 0.001 |
| | Biologic first year | 8.3 | 8.7 | 0.847 |
| | Biologic during disease course | 37 | 36 | 0.87 |

*All PsA patients given methotrexate prior to 1986 had been prescribed this by their dermatologist.

Table 2. Surgery in the rheumatoid arthritis (RA) and psoriatic arthritis (PsA) cohorts.

| | RA | PsA |
|---|---|---|
| N | 1010 | 590 |
| Inclusion period | 1972–2009 | 1954–2011 |
| Observation period | 1972–2015 | 1954–2017 |
| Events per 100 patient-years | 5 | 1.4 |
| Patients operated (% of total) | 31 | 20 |
| Number of procedures | 693 | 171 |
| Synovectomy (% of procedures) | 22 | 25 |
| Arthroplasty (% of procedures) | 41 | 53 |
| Arthrodesis or forefoot (% of procedures) | 35 | 15 |
| Most frequently operated area (%) | Ankle/foot (26) Wrist/hand (23) | Knee (39) Hip (28) |

The disease activity, as measured by erythrocyte sedimentation rate (ESR), was higher in RA patients, where 40% of patients in the cohort had ESR ≥ 60 mm/h in the first 2 years of disease, whereas for PsA 21% had an ESR ≥ 60 mm/h during the disease course ($p < 0.001$).

Mean body mass index (BMI) was significantly higher for PsA patients (27.5 kg/m$^2$) than for RA patients (25.5 kg/m$^2$) ($p < 0.001$). For PsA, BMI was significantly higher for patients diagnosed in 1999–2011 (27.9 kg/m$^2$) than for patients diagnosed before 1986 (26.4 kg/m$^2$) ($p = 0.033$).

## Discussion

Although not to the same extent as for RA, PsA patients have, to an increasing degree, been treated with synthetic, and in later years, biologic DMARDs (3).

Our comparative analysis of medical treatment shows that since 1986 RA patients have been significantly more often prescribed methotrexate, both in the first year and during the disease course. For biologic drugs, more RA patients had these prescribed during the disease course when diagnosed in 1986–1998, whereas for patients diagnosed in 1999 onwards, there was no difference between diagnoses. This suggests a more aggressive treatment of PsA in later years, and may also reflect that treatment with methotrexate has been less efficient for these patients than for RA patients. RA patients prescribed methotrexate in the first year after diagnosis had a significantly lower risk for later surgical procedures. Any use of biologic drugs during the disease course did not affect the outcome (9). For PsA patients, we found no impact of the use of methotrexate or biologic drugs, concerning the risk of orthopaedic surgery (10).

PsA patients had a less severe prognosis, with an overall lower risk of surgery during the disease course. They also had lower disease activity as measured by ESR.

Our patients in the RA and PsA cohorts were treated within the same facility, with a common treatment philosophy, by physicians following the same guidelines in providing care for the entire region of western Norway. The same group of orthopaedic surgeons evaluated the indication for surgery for both diagnoses. We believe the homogeneity in these aspects to be a major strength of our study, which enables as unbiased a comparison of the groups as possible for a non-randomized controlled trial.

Some studies have shown that while hand and foot surgery rates in RA have declined, large joint replacements remain unchanged (11, 12). Other research has found a decrease also in hip and knee replacements (13). It has been discussed whether the inflammation process in large joints differs from that of small joints (11), but the general increase in large joint replacements in the population also offers an explanation. Whereas arthroplasty in joints other than hip and knee were found to be frequent in RA (18% of prosthesis procedures), this was seldom performed in patients with PsA, where 96% of prosthesis surgeries were hip and knee procedures. As large joint replacements account for a greater proportion of surgery in PsA than in RA (51%

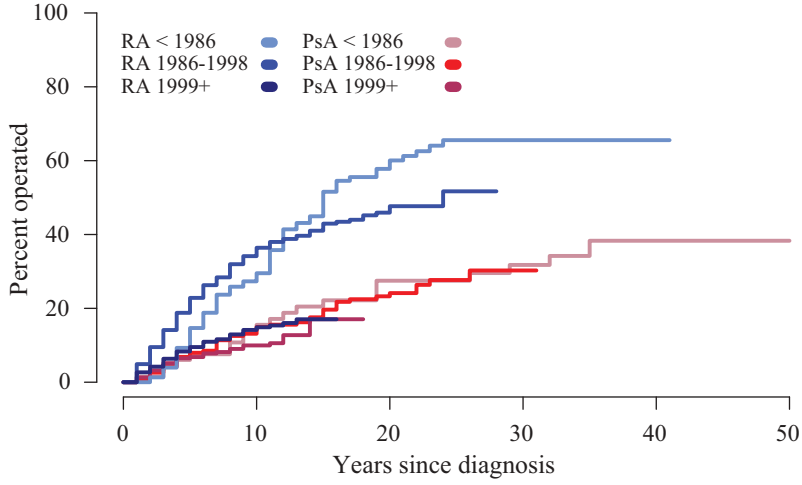


Figure 1. Cumulative risk of orthopaedic surgery for patients with rheumatoid arthritis (RA) and psoriatic arthritis (PsA) in three different time periods.

vs 33% in our material), this may be an explanation why RA in later years was associated with a decreased risk of surgery, whereas for PsA the prognosis, with regard to the outcome of orthopaedic surgery, did not change.

PsA patients are more prone to being overweight (14), and obesity increases the risk of osteoarthritis, especially in the knee (15). We found that mean BMI was higher in the PsA cohort than in the RA cohort, and the increasing BMI over time in the PsA patients might contribute to their risk of large joint prosthesis surgery.

When observing the risk of surgery in the three time periods, for the two different diagnoses, it seems that the recent change in medical treatment has reduced the risk of surgery in RA patients to the same level as PsA patients, whose risk has been constant over time.

In contrast to the effect of synthetic DMARDs on structural damage in RA patients (16), the same has not been shown for PsA. As biologic treatment has been shown to prevent joint destruction in PsA (2), we would expect that increasing use of TNF-α inhibitors would lessen the risk of an orthopaedic procedure during the disease course. This was not the case in our material (10). As joint surgery is a late outcome, we may see a decline in such procedures in the future.

## Conclusion

PsA patients received less intensive treatment than RA patients did. Their prognosis, regarding orthopaedic surgery, was also less severe. However, whereas the change in treatment for patients with inflammatory joint disease has had a beneficial effect, regarding orthopaedic surgery, in patients with RA, results for patients with PsA do not show the same trend. An explanation may be that the general increase in large joint replacements has a higher impact on surgery for PsA than for RA, or that the changes in treatment so far have not affected this group to the same extent.

## Disclosure Statement

No potential conflict of interest was reported by the authors.

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