

Implementation of cardiovascular risk factor recording in a rheumatology outpatient clinic

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Abstract:

Background: The high cardiovascular (CV) risk in patients with rheumatoid arthritis (RA) is under-recognized and under-assessed in both primary and secondary health care. Our aim was to evaluate the quality of CV risk recording in rheumatology outpatient clinics and to evaluate strategies for optimizing CV risk factor screening in RA patients.

Methods: RA patients (n=1142) who visited the rheumatology outpatient clinic at the Hospital of Southern Norway in 2012, either attended the regular rheumatology outpatient clinic (RegROC), or an arthritis clinic (AC) that included a structured, systematic, interdisciplinary team-based model with annual CV assessments. Both patient groups had CV risk factors recorded in the patient medical journal, as well as in a computerized journal program, GoTreatIT-rheuma (GTI-r). We conducted thorough searches in both journals to ascertain how many patients had recorded CV risk factors.

Results: The AC patients had significantly more CV risk factors recorded compared to the RegROC patients (p-values <0.001). The relative risks for CV risk factors being recorded in the patient journals were 2.2-2.8 for various lipid values, 3.1 for brachial blood pressure and 3.3 for glucose. The discrepancies between AC and RegROC patients regarding CV risk factor recording were even more pronounced in the GTI-r journals, relative ratios being: 6.5 for lipid values, 8.4 for brachial BP and 10.2 for a complete CV risk profile.

Conclusion: We have shown that in RA patients attending a rheumatology outpatient clinic, an arthritis clinic approach with a systematic, team-based model of CV risk data collection is superior to CV risk data collection in a regular rheumatology outpatient clinic.

Introduction

RA patients have not experienced improvements in survival over the past 4 decades, and the mortality gap between RA patients and the general population is expanding,(1) a process that is primarily driven by cardiovascular (CV) disease.(1) Thus, there is a considerable unmet need for CV prevention in patients with RA. An audit of existing CV risk factor recording in patients with RA and SLE in 7 centers in UK found that a substantial proportion of patients had no record of CV risk factors.(McErlane 2008) We have founded a preventive cardio-rheuma clinic,(2) and find that there is a need for recording of CV risk factors prior to referral of patients for CV risk evaluation.

There is a high prevalence of traditional CV risk factors, such as hypertension, dyslipidemia, insulin resistance, cigarette smoking and obesity in patients with RA.(3)(4) In addition, CV risk factors are often suboptimally treated in this patient group.(5)(6)(7)(Cindy Crawson 2013, in press) A recent study reported that only 70% of RA patients with comorbid CVD, diabetes or hyperlipidemia consult a primary care physician (PCP) annually,(8) and furthermore the CV risk imposed by RA is both under-recognized and under-assessed in primary care.(8)(9) Moreover, the clinical presentation of angina pectoris and acute coronary disease in RA subjects is more likely to be atypical or silent,(10)(11)(12) thus further accentuating the importance of a thorough CV assessment. As a consequence of these findings, several recent studies have concluded upon the urgent need for an intercession, advocating an approach that involves education, systemic risk factor screening, monitoring and appropriate treatment of CV risk factors in RA patients.(5)(9)(13)(14)(15) Indeed, EULAR recommendations for CV risk factor management in RA patients advocate annual CV risk assessment in RA subjects to reduce the excess CV risk.(16)

There is a need for translation of the knowledge of increased CV risk in RA into rheumatology clinical practice, and to achieve this is a question of strategy and implementation. However, we are only in the early stages of the process towards CV risk evaluation and CV prevention in rheumatology outpatient clinics, the first step being recording of the CV risk factors.

Our aim was to evaluate the degree to which CV risk factor recording is performed in a rheumatology outpatient clinic. Additionally, we wanted to compare the CV risk factor recording in a regular rheumatology outpatient clinic; versus a novel, interdisciplinary, structured and systemized clinical model. Finally, we

discussed strategies to improve delivery of appropriate CV screening in a rheumatology outpatient clinic setting.

Patients and methods:

Patient population

The Hospital of Southern Norway provides health care for around 280 000 people in the two southernmost counties in Norway. During the course of 2012, 1142 RA patients visited the rheumatology outpatient clinic of this hospital. The rheumatology outpatient clinic follows the principles of tight control and treating disease to target.⁽¹⁷⁾ To ensure that these goals are achieved, the clinic has introduced a structured and systematic model for patient monitoring, called the arthritis clinic (AC). This initiative involves physicians, nurses and medical secretaries and implements a checkbox-based model to ensure a complete examination. No inclusion criteria were applied in the allocation of RA patients to the AC, as it was based exclusively on the physician's assessment that the patient's rheumatologic condition would benefit from the program. The AC was restricted by its capacity, hence only about half of the patients followed in the rheumatology outpatient clinic were allocated to this program. Patients who were not invited to the AC attended regular rheumatology outpatient clinic (RegROC) visits.

Collection of CV risk data

To effectively collect real-time data from each patient, the rheumatology outpatient clinic has implemented the use of a benchmarking software program called GoTreatIT-Rheuma (GTI-r). GTI-r is primarily developed for rheumatology disease data, but there is also an incorporated CV module. The program contains patient self-reported questionnaires, laboratory values and core set variables such as tender and swollen joint count. The GTI-r also calculates composite measures such as rheumatology disease activity scores (e.g. DAS28) and systematic coronary risk evaluation (SCORE). The data in GTI-r is stored in a central server, thus enabling benchmarking and making the data readily available for health professional in a clinical situation.

For patients attending the AC, visit intervals would vary according to disease activity and the need for therapeutic monitoring. However, annual, extended visits

were mandatory. From late 2011, these annual visits also included recording of CV co morbidity, CV medication and CV risk factors, including lipid profile, brachial blood pressure (BP), fasting glucose values and glycated haemoglobin (HbA1c). The CV risk data recording was performed in a systemized, checkbox-based collaboration between medical secretaries, nurses and physicians. In this collaboration, the medical secretaries made patient appointments, ordered laboratory tests and imported the laboratory results into GTI-r. The nurses measured brachial BP and imported it into the regular patient journal and GTI-r, while the physicians made a CV risk assessment from data available in GTI-r. There was no systematic approach to collect CV risk data in the RegROC, although the physicians were bound by the same CV risk assessment recommendations.

Patient data search

The data search in this study was conducted in three separate steps (fig. 1). Firstly, the 1142 RA patients were categorized into 2 groups (step 1): those following the AC program and those attending RegROC visits. Secondly, we did a thorough search in the medical patient journal (step 2) to ascertain which patients had brachial BP recorded on any day of an AC or RegROC visit in 2012. Similarly, we enquired if the patients had CV laboratory values (lipids, fasting glucose and HbA1c) taken within two weeks prior to, or after, an AC or RegROC visit (step 2). This step did not include a search for CV medication or CV co morbidity. Thirdly, in a similar manner, we searched the GTI-r patient journal (step 3) for CV laboratory, BP values, CV medication and CV co morbidity and noted which patient did not have these recorded (step 3). This step did not include a search for fasting blood glucose or HbA1c.

The SCORE value provides a 10-year risk estimate for fatal coronary atherosclerosis and is an evidence-based predictor for future fatal coronary atherosclerosis.⁽¹⁸⁾ SCORE is a composite measure calculated from the variables age, sex, total cholesterol, systolic BP, and smoking status. Accordingly, from a rheumatology clinical setting viewpoint, we decided to consider the patient journal to have complete CV risk data when these variables were present.

Finally, we extracted data from the AC or RegROC visits that contained CV risk factor data to compare CV risk profiles in patients in the AC program versus patients attending RegROC, thus enabling the investigation of possible allocation bias to either group, confounded by CV morbidity or CV risk factors.

Statistics

The data are presented as crude data and the results are expressed as mean±SD and median (IQR) for normally and non-normally distributed characteristics, respectively. The data was compared using paired samples t-test, Kruskal-Wallis- and χ^2 - tests as appropriate. Data analyses were performed using IBM SPSS V20.

Results:

Out of the 1042 RA subjects who visited the rheumatology outpatient clinic at the Hospital of Southern Norway in 2012, 530 patients (151 male, 379 female) followed the AC program, while 612 patients (208 male, 404 female) patients attended RegROC visits. Comparing the proportions of patients in the AC and RegROC groups with available CV risk factor data in the medical and GTI-r journals, patients in the AC program were significantly more likely to have the various CV risk factors recorded (for all $p < 0.001$) (**Table 1**). In the medical journal, relative risks between patients in the AC program and the RegROC were 2.2-2.8 for the various lipids, 3.1 for BP, 4.65 for blood glucose and 3.25 for HbA1c. In the GTI-r journal, the discrepancies were even more pronounced; here relative risks between the AC and RegROC groups were 6.5 for lipid values, 8.4 for brachial BP. Finally, the relative risk for a complete CV risk profile, and hence a computed SCORE in the GTI-r journal, was 10.2 when comparing the AC versus the RegROC group.

There were significantly more females in the AC program ($p=0.046$) and the RegROC group was older than the AC group ($p=0.002$) (**Table 2**). However, there were no significant differences between AC and RegROC patients concerning SCORE, CV risk markers, BP, lipids, fasting glucose or HbA1c values. Similarly, the percentage of patients using CV medication or having CV co morbidity of those who had CV risk factors recorded in GTI-r was not significantly different between the two groups. Therefore confounding by CV morbidity or risk factors in the process of allocation to AC or RegROC is not plausible.

Discussion:

There is an urgent need for translation of the knowledge of the augmented CV risk in RA patients, into direct clinical practice. Patients who participated in a structured, multidisciplinary AC in a rheumatology outpatient clinic were significantly more likely

to have CV risk factors recorded compared to patients attending RegROC. Our data suggest that when CV risk factor recording is not carried out as part of a structured model, it is less frequently performed. Several elements are of importance in the process of implementing such structured models:

1. A structured and systematic approach to CV data gathering.

The most important difference between the two clinical models in our study was the systematic approach implemented in the AC program. We found that when annual CV risk assessment is performed in a systematic manner, patients are two to four times more likely (depending on the risk factor) to have CV risk factors assessed. Patients in the AC group were also six to eight times more likely to have such risk factors imported into a designated computerized program allowing easy access to data by eyeballing and easy score calculation, and a ten-fold more likely to have a complete CV risk profile in this program. Short patient questionnaires are other systematic approaches that can easily be collected from each patient in the waiting room, as part of the infrastructure of a clinical rheumatology setting. (19) Several CV questionnaires have been developed. With scarce resources, a simple algorithm aimed at identifying individuals at high CV risk was found to be highly effective when given to non-physician health workers in rural India.⁽²⁰⁾

2. Assigning CV risk factor recording to rheumatology nurses.

In hospital and outpatient settings, nurses often act as the interface between the patient and a wide multidisciplinary therapeutic team. The CV disease risk in the RA is comparable to that in type 2 diabetes.(13)(21) Nurse-led CV risk intervention is common in diabetes clinics, and has beneficial effects on CV risk factor targets (blood pressure, serum lipids and HbA1c) in both diabetes type 1(22) and type 2.(23)(24)(25) Other high risk patient groups has also benefitted from implementing nurse-directed, multifactor CV risk reduction.(26)(27)(28)(29) Nurse-based consultations are widely used in rheumatology outpatient clinics, and has been shown to bring added value to patients' outcomes at a lower price, improve communication, continuity, satisfaction with care and patient-preferred outcomes, without loss of efficacy in terms of clinical outcomes.(30)(31) We advocate expanding rheumatology nurse responsibility to also include CV risk factor recording.

3. Designated personnel for CV data gathering quality assurance.

Although there were significantly more patients in the AC group than in the RegROC group who had available CV risk factor data in the patient journals, the recording of CV risk factors in the AC was still suboptimally performed. There may be several reasons for this. We did not have the possibility to evaluate how many patients in the AC missed their annual appointment and therefore did not have CV risk data recorded. Furthermore, laboratory tests were often taken after the consultation, accordingly the therapeutic personnel were less likely to ensure that the patients had them taken. Still, we cannot exclude that part of the reason for incomplete CV risk data recording lies with medical personnel lacking adherence to protocol. We propose that more patients would have had CV risk factors recorded if the AC had assigned designated personnel, for instance a medical secretary, to oversee the data collection process. Such personnel would easily detect when CV data recording was missing and arrange for it to be collected/recorded afterwards.

4. Designated computerized programs

The advantage of a computerized program for data collection and recording data is that benchmarking and register can be achieved in one work flow. Appropriated software will arguably alleviate the monitoring and retrieval of CV risk information in RA patients, thereby allowing it to be used to guide CV decision making when choosing therapy and/or referring to a cardiologist.

In conclusion, we have shown that a structured, systematic, team-based model for CV risk data collection was necessary to obtain CV risk factor recording in RA patients attending a rheumatology outpatient clinic. We propose four basic elements that can alleviate the implementation of CV risk factor recording process.

Legends

Figure 1.

Rheumatoid arthritis patients visiting rheumatology outpatient clinic.

AC: Arthritis Clinic, RegROC: regular rheumatology outpatient clinic, BP: blood pressure, GTI-r: the rheumatology version of the electronic based patient journal named GoTreatIT-rheuma

Fig. 1

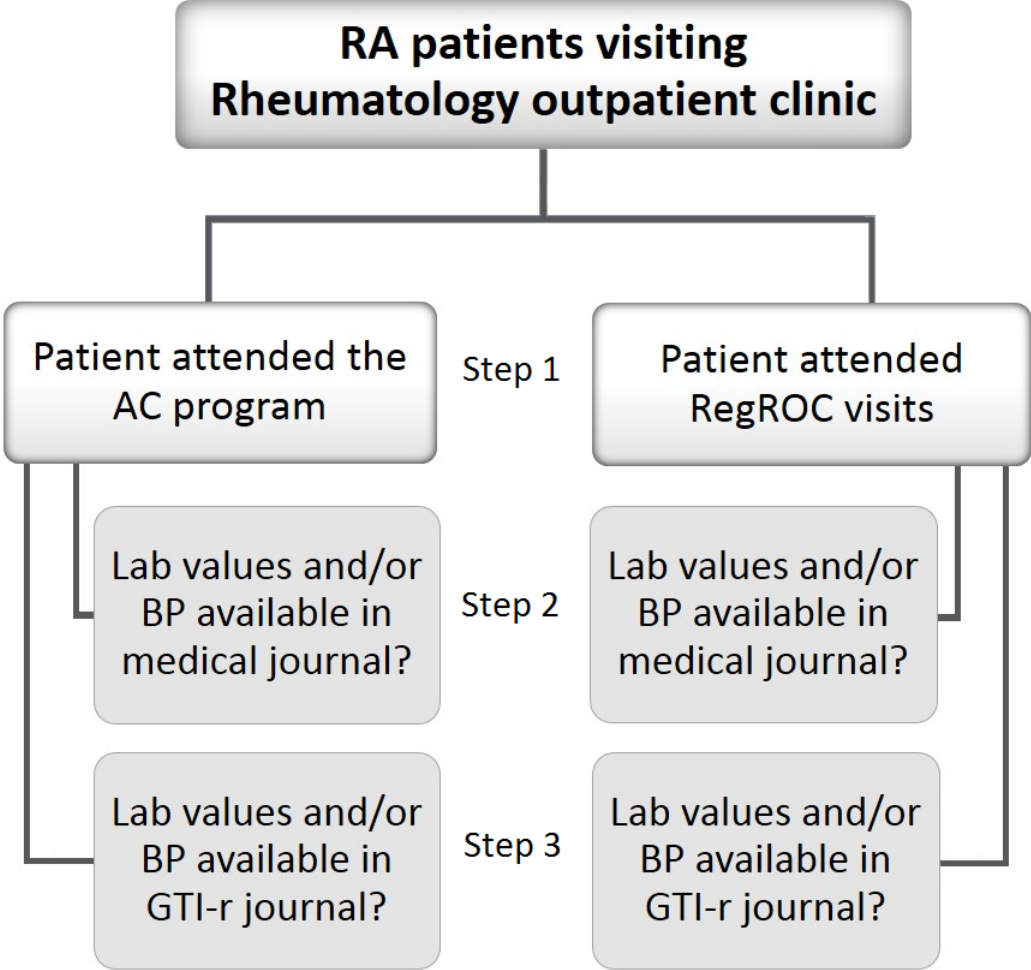


Table 1: CV data recorded in patient journals

CV data available	RegROC group (n=612)	AC group (n=530)	RegROC vs. AC P-value	Relative ratio (AC/RegROC)
Medical journal: <i>n (%)</i>				
Total cholesterol	183 (29.9)	354 (66.8)	< 0.001	2.23
LDL-cholesterol	156 (25.5)	347 (65.5)	< 0.001	2.57
HDL-cholesterol	165 (27.0)	350 (66.0)	< 0.001	2.44
Triglycerides	139 (22.7)	333 (62.8)	< 0.001	2.77
Brachial BP	155 (25.3)	421 (79.4)	< 0.001	3.14
Fasting blood glucose	70 (11.4)	281 (53.0)	< 0.001	4.65
HbA1c	101 (16.5)	284 (53.6)	< 0.001	3.25
GTI-R journal <i>n (%)</i>				
Brachial BP	51 (8.3)	371 (70.0)	< 0.001	8.43
Lipid values	57 (9.3)	321 (60.6)	< 0.001	6.52
Complete risk profile	31 (5.1)	276 (52.1)	< 0.001	10.22
CV medication	53 (8.7)	198 (37.4)	< 0.001	4.30
CV co morbidities	47 (7.7)	184 (34.7)	< 0.001	4.51

RegROC: Regular rheumatology outpatient clinic, AC: Arthritis clinic, CV: Cardiovascular, LDL: Low-density lipoprotein, HDL: High-density lipoprotein, BP: Blood pressure, HbA1c: Glycated haemoglobin, GTI-r: GoTreatIT-rheuma, Complete risk profile: Complete lipid values and blood pressure, CV medication: Anti-hypertensives and statins, CV Comorbidities: Hypertension, angina pectoris, acute myocardial infarction, percutaneous coronary intervention, coronary artery bypass graft surgery, cerebrovascular accident, premature familial cardiovascular disease.

Table 2: Traditional CV risk factors, medication and CV co morbidities.

	RegROC (n=612)	AC-group (n=530)	p-value
Sex (male) <i>n</i> (%)	208 (34.3)	151 (29.2)	0.046
Age (<i>median, IQR</i>)	66.00 (52.75-70.00)	62.00 (53.00-70.00)	0.002
CV risk factors (<i>mean ±SD</i>)			
Total cholesterol (mmol/L)	5.42±1.20	5.55±1.19	0.239
LDL (mmol/L)	3.21±1.00	3.32±1.03	0.265
HDL (mmol/L)	1.69±0.51	1.66±0.50	0.638
Triglycerides (mmol/L)	1.49±0.87	1.40±0.74	0.315
Sys BP (mmHg)	137.1±20.1	137.2±19.3	0.956
Dia BP (mmHg)	82.7±11.1	82.1±9.3	0.492
Fasting glucose (mmol/L)	5.75±1.60	5.71±1.64	0.849
HbA1c (%)	5.74±0.83	5.71±0.85	0.787
Smoking <i>n</i> (%)	56/378 (14.8)	61/367 (16.6)	0.499
CV risk assessment (<i>mean ±SD</i>)			
SCORE 10years in %	3.71 (3.48)	4.00 (4.5)	0.641
CV medication/co-morbidities: <i>n/N</i> (%) <i>n</i> : patients using medication/having CVD <i>N</i> : patients with medication/CVD recorded			
Statins	12/53(22.6)	54/198 (27.3)	0.496
Antihypertensives	14/53 (26.4)	56/198 (28.3)	0.788
Hypertension	10/47(21.3)	48/184 (26.1)	0.497
Angina pectoris	1/47 (2.1)	4/184 (2.2)	0.984
AMI	0/47(0)	4/184 (2.2)	0.308
PCI/CABGS	1/47(2.1)	6/184 (3.3)	0.686
CVA	4/47(8.5)	5/184 (2.7)	0.067
Premature familiar CVD	4/47(8.5)	36/184 (19.6)	0.074

CV medication, CV comorbidity and smoking data are presented as the fraction and percent in those patients who had CV risk factors recorded.

RegROC: Regular rheumatology outpatient clinic, AC: Arthritis clinic, CV: Cardiovascular, AMI: Acute myocardial infarction, PCI: Percutaneous coronary intervention, CABG: Coronary artery bypass graft surgery, CVA: Cerebrovascular accident, CVD: Cardiovascular disease, LDL: low-density lipoproteins, HDL: High-density lipoproteins, Sys: Systolic, Dia: Diastolic, BP: blood pressure, HbA1c: Glycated haemoglobin, SCORE 10y: Systematic coronary risk evaluation 10 years, MHAQ: Modified health assessment questionnaire

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