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BRIEF REPORT

Early arthritis clinic is cost-effective, improves outcomes and reduces biologic use

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Abstract

There is good evidence that dedicated early arthritis clinics (EACs) improve referral lag time and reduce delay in establishing disease-modifying therapy. However, it remains arguable whether such clinics improve relevant disease outcomes. Nationally, only 57% of units have dedicated EACs. Our rheumatology department established a centralised, patient-focused and multidisciplinary EAC to achieve key financial and clinical outcome targets the department was failing to meet. The EAC aimed to increase the department's capacity to accommodate referrals from general practitioners (GPs) and other sources, decrease the time between diagnosis and starting therapy, establish standardised treatment algorithms and reduce biologic use. The EAC was established in January 2016 and comprised the introduction of a dedicated referral pro forma and an EA educational programme for GPs, pooling of all sources of referral, running of six EACs per week with availability of ultrasound and introduction of a standardised approach to the early initiation of therapy and timely review of treatment outcomes. The introduction of the EAC was associated with improved clinical outcomes (EA patients achieving a Disease Activity Score 28 (DAS28) < 3.2 in 2015, 38.0% [$N = 113$] vs. 78.5% [$N = 220$] in 2016) and overall patient experience (mean waiting time for EA patients' first appointment in 2015: 12 weeks vs. 2.5 weeks in 2016; 94% [$N = 167$] of patients recommended the rheumatology service in 2016 vs. 74% [$N = 100$] in 2015). The total costs associated with introducing the EAC were ~£201,362. Use of biologics decreased from 26.0 to 5.6% between 2015 and 2016, resulting in a cost saving of ~£394,942. Other cost savings associated with the EAC included reductions in the overall cost/patient seen (2015, £198.88; 2016, £74.98) and not running any premium rate initiative clinics (saving ~£26,500 in 2016) to meet waiting list targets. Efficiency gains from the introduction of the EACs have improved patients' health and overall satisfaction with their treatment, whilst saving costs for healthcare.

Keywords Biologic · Clinic · Cost-effective · Early arthritis · Service

Introduction

Early arthritis is a well-established concept recognised in various guidelines. The European League against Rheumatism (EULAR) published its first set of recommendations for the management of early arthritis in 2007, which were updated in 2017 [1]. The emphasis is on prompt referral to rheumatology, early diagnosis and initiation of appropriate therapy to improve prognosis and ameliorate irreversible damage. In the UK, the National Institute for Health and Care excellence (NICE) also published quality standards to encourage timely referral and commencement of treatment thereby facilitating practical implementation of 'window of opportunity' therapeutic model [2].

There is however wide variation in the provision of early arthritis service in different health care settings. Though the concept of early arthritis clinics (EACs) to deliver treatment goals has been around since 1980s, such clinics are not ubiquitous [3]. In fact, the National Early Inflammatory Arthritis Audit (NEIAA) showed that in the UK only 57% of rheumatology units have EACs [4]. There is good evidence that dedicated EACs improve referral lag time and reduce delay in establishing disease-modifying therapy. However, it remains arguable whether such clinics improve relevant disease outcomes [5]. Our unit established a centralised, patient-focussed and multidisciplinary EAC to achieve key financial and clinical outcome targets.

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Our rheumatology department provides a comprehensive general and specialist rheumatology service to the local population of nearly 350,000 with 40% ethnic minorities. In 2015, newly referred EA patients had to wait more than 45 days for their first appointment, which was double the waiting time recommended by the NICE quality standards. The low capacity and long waiting times of the rheumatology department led to a 29% loss of referrals from local referrers and poor patient experience, with 700 overbookings and 26% of patients stating that they would not recommend the service. Hence, an attempt was made to improve the rheumatology service by adopting an EA treatment pathway in general clinics. Despite the initiative, clinical outcomes for EA patients were poor (data are discussed in a later section), and only 9% (14/157) of patients met the quality standards.

Objectives

The EAC was established in Jan 2016 aimed to increase the department's resilience to accommodate referrals from general practitioners (GPs) and other sources, decrease the time between diagnosis and starting therapy, establish standardised treatment algorithms and reduce biologic use.

Methods

This is a retrospective review of early arthritis cohort treated for 12 months before and after the introduction of EAC (2015 vs. 2016). The following changes were made to service specification to help achieve the above objectives:

- The introduction of six EACs each week, staffed by a team of six consultants.
- A dedicated referral pro forma was established that was advertised locally and communicated to GPs. The CCG Planned Care lead also helped to disseminate the information about the pathway more widely.
- A specific consultant rota for the daily triage of referrals to avoid transit delays.
- An educational programme to ensure GPs refer suspected EA patients through the new EA pathway instead of through routine review requests (Fig. 1a).
- A standardised approach to early initiation of treatment, drug education and a timely review of outcomes through the EA treatment pathway (Fig. 1b)—corticosteroids and hydroxychloroquine initiated during the first EA visit followed by a rapidly escalating methotrexate regimen 2 weeks later.
- The lead clinical nurse specialist achieved prescriber status to avoid any delay in issuing disease-modifying antirheumatic drug (DMARD) prescriptions.
- Ultrasound was incorporated into all EACs to improve diagnostic accuracy. Blood parameters including FBC, CRP, U&ES, LFTs, rheumatoid factor, ACPA and ANA and radiographs of hands and feet were also undertaken.
- A pathway coordinator was recruited to track and monitor adherence to the pathway and performed regular troubleshooting. The project coordinator organised all appointments for EA patients and maintained all data on EAC activity.
- All patients received comprehensive disease education in the DMARD initiation clinic with rheumatology clinical nurse specialist detailing point of contact for any disease or drug related queries.
- A nurse advice line with 24 h turn-around time was available to all patients to discuss urgent issues such as infections or use of antibiotics.
- Allied therapies including physiotherapy, occupational therapy and podiatry could be accessed at any point as required. The annual review clinic at the end of first year provided further opportunity to address pertinent clinical issues beyond articular disease.

Statistical analysis

Disease activity scores of two cohorts were compared using independent samples unpaired *t* test or Mann–Whitney *U* test depending on criteria for parametric distribution of data. Statistical analysis was conducted using the IBM SPSS Statistics 23 software and Epi Info version 7.0 (CDC Atlanta USA). A p value of < 0.05 was taken to indicate statistically significant differences.

Results

Demographics

Pre-EAC cohort (2015): Of 1380 referrals, 157 were triaged as EA patients. One hundred thirteen were confirmed to have EA. Mean age was 53.1 years with 67% women. Twenty-four per cent belonged to ethnicities other than Whites.

Post-EAC cohort (2016): Of 1884 patients referred, 482 (25.5%) were triaged into EACs based on set criteria. Two hundred forty-seven (51%) were confirmed to have EA. Mean age was 52.4 years (17–86 years). One hundred fifty-seven (63.5%) were women. One hundred seventy-seven (71.6%) were White, 58 (23.5%) of Asian and 12 of other background. The median delay from symptom onset to GP presentation was 26 weeks (0.4–1043 weeks, $n = 230$) and the median time for GP referral to the rheumatology department was 4 days (0–84 days, $n = 244$) (Table 1).

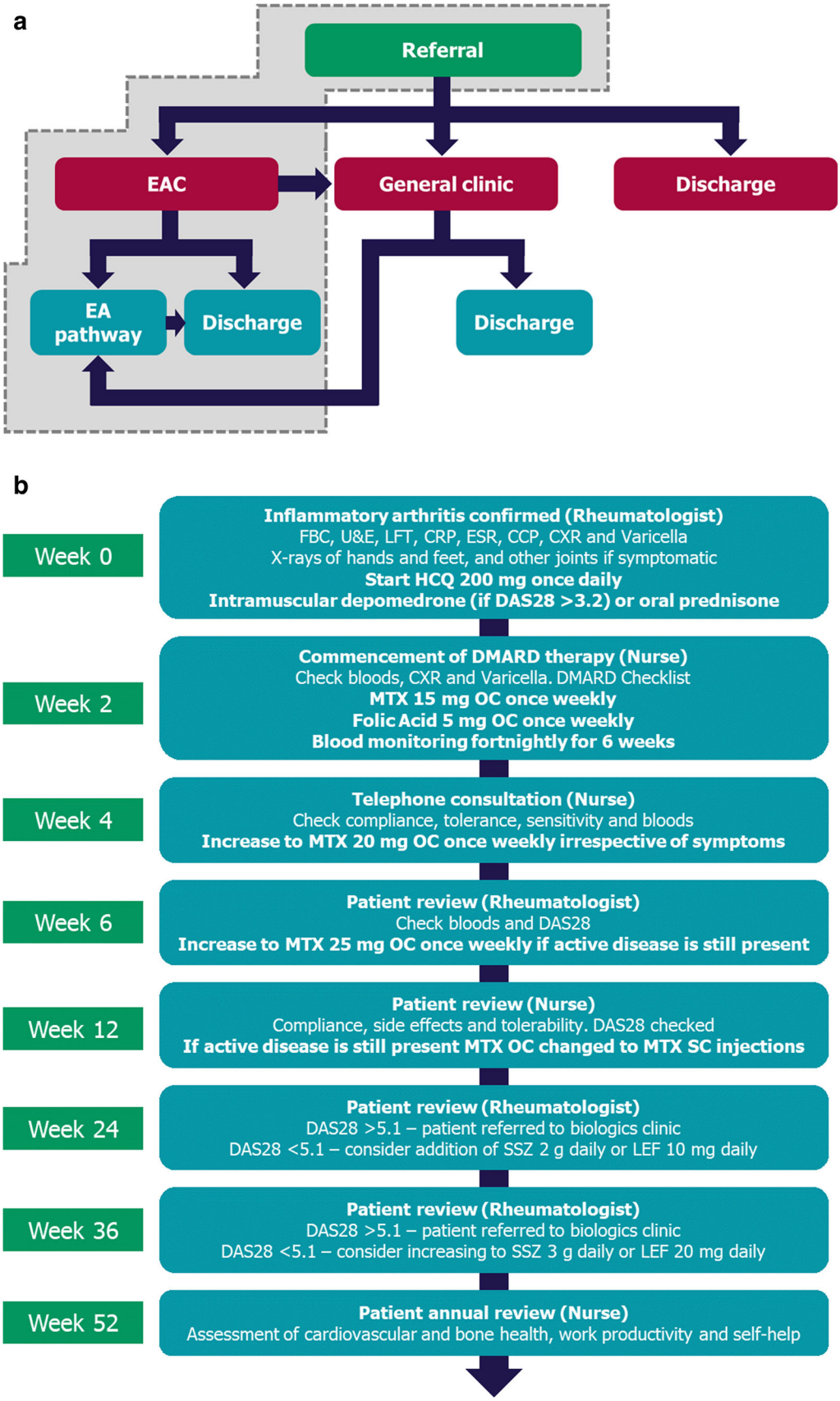

Fig. 1 **a** Patient referral pathway (service diagram). **b** Early arthritis treatment pathway

Table 1 Demographics and disease status of 2015 (pre-EAC) and 2016 (post-EAC) cohorts

	Pre-EAC (2015)	Post-EAC (2016)
Total triaged to EAC service	157	482
EA confirmed patients	113	247
Age	Mean 53.1 (18–84)	Mean 52.4 (17–86)
Gender	75 (67%) female	156 (63.5%) female
Ethnicity		
Caucasian	79 (70.1%)	177 (71.6%)
Asian	27 (24.5%)	58 (23.5%)
Other	7 (6.2%)	12 (4.9%)
Educational status		
Low	51%	50%
Moderate to high	39%	37%
Unknown	10%	13%
Mean comorbidities	3	3
Median disease duration (weeks)	24 (0.3–780)	26 (0.4–1043)
DAS28 at referral	4.89 (0.9–7.7)	4.65 (0.6–8.0)
Erosive disease at presentation	13 (11.5%)	25 (10%)

Clinical outcomes

After establishing the EAC in 2016, 78.5% of patients achieved a disease activity score-28 (DAS28) of < 3.2 (low disease activity), compared to 38.0% in 2015 ($p < 0.005$). The median time to achieve low disease activity improved from 36 weeks in 2015 to 20 weeks in 2016. Finally, the median DAS28 at 1 year was 2.6, compared to 3.6 in 2015 ($p < 0.05$).

Patient experience outcomes

The introduction of the EAC impacted several aspects of patient experience including mean waiting time for EA patients reduced from 12 to 2.5 weeks. Referrals to diagnosis and treatment standards were achieved in 95% of cases in contrast to 9% in 2015. Clinic overbooking improved from 700 to 0. Did not attend (DNA) rate dropped from 8.6 to 5.4%. Patient feedback improved from 74 to 94%.

Financial outcomes

A number of financial gains were made following introduction of the EAC including a decreased cost/patient seen at the department (including new patients, follow-up appointments, overbookings and initiative clinics). A reduction of 100% was seen in the use of premium rate initiative clinics that were breaching the 18-week referral-to-treatment target. Biologics used dropped from 26 to 5.6% resulting in a cost saving of ~ £394,942 (Table 2).

Discussion

Our study strongly supports the utility of EACs confirming that dedicated EACs not only improve clinical and process outcomes but also achieve significant financial savings for healthcare. To our knowledge, this is the first report to confirm clinical and monetary benefits of EACs. A systematic review highlighted that apart from the efficacy in reducing the referral lag time, scarce evidence-based information is available about the performance of the EAC organisation model in terms of outcome improvement. Of the 11 studies included, only two reported clinical outcomes [5].

It is intuitive to think that improved organisational aspect of early arthritis management will enhance clinical outcomes;

Table 2 Comparison of 2015 (pre-EAC) and 2016 (post-EAC)

	Pre-EAC (2015)	Post-EAC (2016)
Waiting times	12 weeks	2.5 weeks
NICE quality standard achieved	9%	95%
LDA target achieved (DAS28)	No (median 3.6)	Yes (median 2.6)
Time to LDA	36 weeks	20 weeks
% of patients with LDA	38%	78.5%
Positive patient experience	74%	94%
DNA rate	8.6%	5.4%
Work productivity	NA	83%
Cost/patient seen, £	198.88	74.98
Initiative clinics, *n*	53	0
Costs of initiative clinics, £	26,500 ($n = 53$)	0 ($n = 0$)
Use of biologics, *n* (%)	41/157 (26)	14/247 (5.6)
Costs of biologics, £	534,147	139,215

however, data is limited to early aggressive therapy models without clear comparison of EAC delivered care vs. unstructured service [5]. Similarly, no study has reported financial sequelae of EACs which is a key focus of this paper.

In comparison to the rheumatology service in 2015, prior to the establishment of the EAC, several improvements were observed in the clinical outcomes of patients channelled through EAC. The percentage of patients achieving disease activity target nearly doubled with median DAS28 dropping to remission threshold of 2.6 within 5 months. All these achievements were statistically significant. This is despite the fact that the treatments used, escalation protocol employed and the grade of therapy providers (consultant rheumatologists and clinical nurse specialists) were the same in both cohorts.

In addition to the improvements in clinical outcomes for patients following the EA pathway, there have been several other improvements in the overall rheumatology service including a 4.8-fold reduced mean waiting time for EA patients, an improvement in overbookings over 1 year of 100%, a 63% decrease in the number of patients not attending appointments and an increase of 20% in the number of patients that would recommend the rheumatology service.

An analysis of workplace productivity of patients in 2016 ($n = 190$), 1 year after the implementation of the EAC, demonstrated that 83% patients experienced no impact of their disease on their work and only 2% patients had to take time off work due to illness. Equivalent data are not available prior to the implementation of the EAS; however, work productivity analysis in the UK have found that only 45% patients with a rheumatic condition were in work and that 29% patients reported that they had given up working partly or mainly due to their rheumatic condition [6].

The costs associated with the prescription of biologics at 12 months after the introduction of EAC were £139,215 ($n = 14/247$) compared to 2015 when £534,147 ($n = 41/157$) was spent on biologics—a substantial cost saving of approximately £394,932 in a year. Looking at the total capacity of the service, each unit of capacity was costing the department £74.98 on average. When compared to the average cost per unit of capacity in 2015 (£198.88), the hospital saved approximately £123.90 for each unit of capacity in 2016. In addition to these immediate cost savings, based on published evidence, there will also be longer-term financial gains as good control of inflammatory arthritis translates to better long-term outcomes [7].

Our study reassures commissioners and payers that EAC could be replicated in other trusts to improve patient experience and clinical outcomes whilst delivering more cost-effectively. The costs of establishing the service in other health care settings will likely differ; however, as our experience shows that the costs need not be too high, rather focus on right triage, treatment to target and outcomes focused management can achieve good outcomes. Considering the size of our catchment is quite similar to most district general hospitals, just by smartly utilising existing slots and improving pathways and processes could make substantial difference to people's lives.

Since the introduction of EACs, beginning with dynamic research units and then spreading to general rheumatology services, wide variation remains in the structure and function of such clinics [8]. These clinics are certainly not universal and minimum standards of service remain undefined. Where EACs are available, the operational model is usually determined by availability of resources and local healthcare system demands. Nevertheless, the aims remain early recognition and treatment of inflammatory arthritis. However, our study is distinctive, as the focus was not on process delivery, but on achieving improvements in clinical outcomes using a centralised, patient-focused and multidisciplinary service. There are however several caveats including the retrospective nature of the study in a single centre. We have relatively high ethnic representation and hence findings may not be generalizable to centres with different population mix. In addition, the cost savings with the advent of oral molecules and biosimilars would be different though still significantly higher than conventional DMARDs.

Conclusion

Our study highlights that dedicated EACs improve clinical, functional and financial outcomes compared to the care delivered outside the structured organisational system of EACs. Such model of care is cost-effective, improves patient experience and reduces high cost drug use.

Compliance with ethical standards

Disclosures None.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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