A UK BEST PRACTICE MODEL FOR DIAGNOSIS AND TREATMENT OF AXIAL SPONDYLOARTHRITIS

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ABSTRACT

Objectives: To examine the combined effectiveness of a care pathway for patients with suspected inflammatory back pain (IBP) in conjunction with an educational campaign targeting primary and secondary care and the local community.

Methods: Between June 2010 and June 2013, general practitioners referred patients fulfilling the Berlin IBP criteria into our Early Inflammatory Back Pain Service (EIBPS). Investigations were undertaken in line with our service model pathway and consultant rheumatologists made a diagnosis based on the Assessment of SpondyloArthritis international Society criteria. A concurrent educational awareness campaign addressing IBP and axial spondyloarthritis (AxSpA), aimed at primary and secondary care colleagues and the local community, was undertaken in order to assist early identification of IBP.

Results: Of the 222 patients referred into the EIBPS, 57 (26%) were newly diagnosed with AxSpA. A diagnosis of AxSpA was made in 48% of the patients with IBP or >1 SpA feature. The median time between onset of back pain and diagnosis was 3.1 years (mean: 5.7 years). Treatment with nonsteroidal anti-inflammatory drugs was initiated or continued as appropriate in 68/71 patients (96%; new and previously diagnosed AxSpA patients). All patients (100%) meeting the National Institute for Health and Care Excellence criteria for tumour necrosis factor inhibitor therapy were offered treatment, with 14 patients (45%) starting this treatment within 6 months of their initial EIBPS appointment.

Conclusion: Our EIBPS provides a best practice model for assessment and management of patients with suspected IBP in the UK. The pathway facilitates prompt admission of appropriate patients into the service and assists early diagnosis and management of AxSpA patients.

Keywords: Ankylosing spondylitis (AS), axial spondyloarthritis (AxSpA), best practice, diagnosis, diagnosis delay, low back pain, treatment.

INTRODUCTION

Axial spondyloarthritis (AxSpA) is an uncommon inflammatory disease that predominantly affects the spine and sacroiliac joints (SIJs) in young adults. It is therefore a rare cause of a frequent complaint and accounts for fewer than 5% of the patients who attend primary care with chronic back pain each year.[1] Early identification of this cohort has traditionally proven problematic in the UK, with an average interval between symptom onset and diagnosis of up to 10 years.[2] With the recent availability of highly effective therapies that work best in early active disease, there is an urgent need to address this delay.[3,4]

Non-radiographic AxSpA (nr-AxSpA) and radiographic AxSpA are proposed to belong to the same disease continuum,[5] with magnetic resonance imaging (MRI) demonstrating active inflammation of the SIJs from an early stage and a proportion of patients developing definite radiographic AxSpA within 10 years of follow-up.[5] This disease process may be slowed using recent advances in treatment, especially of early disease,[6] and so this argues strongly for earlier diagnosis and intervention that is universal. There is a wide variability in the ankylosing spondylitis (AS) facilities available in the UK and the majority of rheumatology services do not provide a dedicated early AS clinic.[2] The launch of 'Looking Ahead:

Best practice for the care of people with AS' in July 2010[7] offered solutions and suggested the use of a standardised service as a benchmark against which any department should be judged. This working group identified that "early recognition of the key features of AS" is essential for effective treatment. Chief among these key features is the identification of inflammatory back pain (IBP) in primary care settings. Recommendations included the training of professionals involved with spinal pain triage of inflammatory as well as mechanical spinal disorders, and that all patients identified should be evaluated for anti-tumour necrosis factor (TNF) therapy by a multidisciplinary team that includes a specialist physiotherapist. Even against a background of financial uncertainty, the majority of the obstacles identified here can be overcome with a named lead clinician holding a declared interest in AS and a specialist physiotherapist. This, along with a structured interface with primary care to target potential IBP patients early, would offer a model of best practice.

With the advent of newer therapies, the problem of delayed diagnosis acts as the obstacle to early effective treatment. It is also a significant barrier to job prospects for young adults during the critical years of their careers.[8] AS has been diagnosed traditionally using the modified New York criteria,[9] which require the presence of radiographic sacroiliitis, and these largely ignore early disease. Newer assessment models, such as the recent Assessment of SpondyloArthritis international Society (ASAS) criteria,[10] use MRI to identify early inflammatory change in SIJs and these should be standardised for early back-pain assessment clinics.

In the UK population, the mean delay in diagnosis has recently been established as 8.57 years.[2] By definition, therefore, this accepts ongoing symptoms over a number of years, irreversible loss of spinal mobility, function,[11] and persistent work incapacity[8] in a young population. Early treatment with nonsteroidal anti-inflammatory drugs (NSAIDs) may slow bony progression,[12] and, more importantly, recent data show that patients with shorter disease duration demonstrate significantly reduced disease progression with anti-TNF therapy over 4 years.[6] The anti-TNF response is better if symptom duration is <10 years.[6,13] Early diagnosis also offers timely provision of exercise information, education, and available support networks to empower patients to assist self-management,

which can reduce disease activity and improve return-to-work prospects.[14]

Early Identification of AxSpA

An ideal model would achieve earlier targeted referral and diagnosis, with identification of likely IBP within primary care as the goal. A back-assessment pathway that acts to prompt identification of IBP with early access to a dedicated service is the way forward. Lack of awareness of AS and its clinical features in primary care, and among other healthcare professions, is a likely contributing factor to lengthy delays. Jois et al.[15] showed inconsistencies in the knowledge of early features and management of AS in primary care. IBP is the primary symptom of AxSpA, with around 75% of AS patients experiencing this.[16] Conversely, the probability of a patient having AxSpA if they do not have IBP is <2%.[17] Using IBP as a screen in primary care is a simple and useful tool to assist with identifying patients who benefit from early referral. Programmed education in primary care is necessary to improve early detection of AxSpA,[15] but application and uptake requires a dedicated team. Improving public awareness of AxSpA and IBP within general practitioner (GP) surgeries, gyms, and shopping centres may lead to patients with these symptoms seeking help earlier. Recent research in New Zealand has demonstrated that public awareness campaigning results in a significant increase in referrals to rheumatology and an increase in diagnosis of AxSpA.[18]

Objectives for a Best Practice Model

i)   To propose a care pathway for patients with suspected IBP in primary and secondary care.

ii) To lead a programme of ongoing education that identifies early IBP in primary care and musculoskeletal services.

iii) To examine the combined effectiveness of new referral parameters, GP and other healthcare professional (HCP) campaigns, and a community-based 'Back on Track' awareness campaign used to identify IBP.

iv) To determine the effect of this on delayed diagnosis in a given service.

v)   To promote awareness of the early features of IBP, supported by the National Ankylosing Spondylitis Society (NASS) and, in some cases, sponsored by industry.

METHODS

Recruitment

Between June 2010 and June 2013, GPs and local musculoskeletal community services in the London boroughs of Waltham Forest and Redbridge were contacted by letter and email and asked to refer patients into the Early Inflammatory Back Pain Service (EIBPS) if they had chronic back pain (>3 months) and fulfilled two of the following four Berlin IBP criteria:[19] i) morning stiffness >30 minutes; ii) improvement with exercise but not with rest; iii) awakening in the second half of the night because of back pain; iv) alternating buttock pain. A referral proforma pack and EIBPS posters outlining the features of IBP were sent out in addition to guidance on locating the service on 'Choose and Book' for referral.

Awareness Campaign

All GPs within the two London boroughs were invited to attend ongoing teaching meetings throughout the 3 years, which included education regarding IBP, AxSpA, and our EIBPS using case histories and referrals from their surgeries. Physiotherapists based at the local hospitals within both boroughs were invited to attend an annual, interactive half-day course run by the AS rheumatologists and specialist AS physiotherapist at Whipps Cross Hospital. Hospital doctors, consultants, and physiotherapists within the department received teaching regarding identifying patients with IBP and associated AxSpA features. A community 'Back on Track' campaign supported by the NASS was initiated within local gyms, hospitals, and shopping arcades, with newspaper press releases and the local radio stations used to raise awareness of IBP and provide an opportunity for people with back pain to discuss their symptoms with consultant AS rheumatologists and a specialist AS physiotherapist off-site at weekends.

EIBPS Service Model

A screening pathway was developed and endorsed by NASS as outlined (Figure 1). Patients were referred into the EIBPS with a proposed presentation of IBP and/or other features suggestive of AxSpA according to ASAS criteria.[10] New referrals were screened by the AS rheumatologists prior to the patient attending the EIBPS in order to exclude non-spinal pain patients inappropriately booked into the service via 'Choose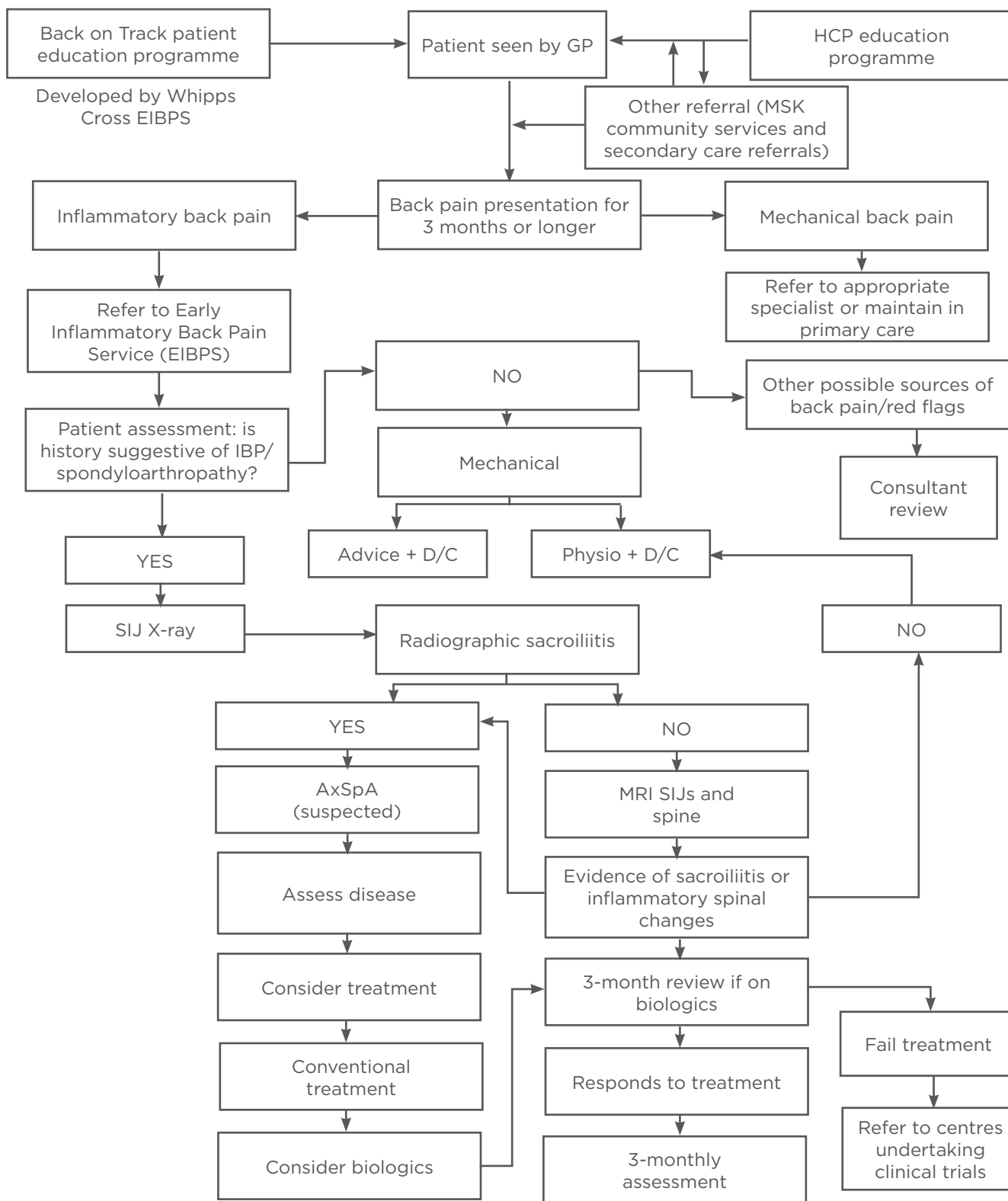 and Book'. During the first assessment, a thorough medical history was taken with particular emphasis on IBP and other SpA features, including: current or previous history of psoriasis, enthesitis, uveitis, peripheral arthritis, dactylitis, inflammatory bowel disease (IBD), reactive arthritis, good response to NSAIDS (<48 hours), and family history. All patients were discussed with, or reviewed by, a rheumatologist in order to limit any potential bias. The diagnostic investigations included: X-rays of SIJs if patients fulfilled the Berlin IBP criteria or if the AS rheumatologist deemed it necessary based on other SpA features; MRI scans of the whole spine and SIJs were undertaken for all patients with a normal or equivocal (sacroiliitis <Grade 2) plain film. Laboratory tests consisted of: human leukocyte antigen (HLA)-B27, C-reactive protein, and erythrocyte sedimentation rate, in addition to full blood count, liver function tests, and urea and electrolytes.

A diagnosis of AS (radiographic AxSpA) was made according to the modified New York criteria.[9] A diagnosis of nr-AxSpA was made according to the ASAS criteria.[10] Data describing patient SpA features and the time taken between onset of first symptoms and diagnosis were entered into a database and analysed. All patients with a new diagnosis of radiographic AxSpA or nr-AxSpA were formally reviewed by the AS rheumatologist to discuss optimal management of their condition. They were invited to attend an educational and exercise course on AxSpA led by the specialist AS physiotherapist and attended by a consultant rheumatologist as a question-and-answer session for early AS and treatment options. Patients were routinely monitored biannually following their diagnosis. However, this was flexible depending upon anti-TNF therapy screening requirements and severity of symptoms. Patients who fulfilled NICE criteria for anti-TNF therapy with a diagnosis of radiographic sacroiliitis (AS), failure of two NSAIDs, and two Bath Ankylosing Spondylitis Disease Activity Index scores >4 were offered treatment.

One of each patient's twice-yearly appointments was within a designated AS clinic, run by the AS consultant and AS physiotherapist, for functional and symptom monitoring, advice, and medication review. Patients requiring onward referral to other multidisciplinary team specialties (e.g. ophthalmology, gastroenterology, orthopaedics, dermatology, occupational therapy, physiotherapy, hydrotherapy, orthotist, social services) were discussed and actioned. A telephone advice service was provided to all AxSpA patients in

order to assist with managing flares, and early review in clinic was arranged as necessary. Patients had the support of their local NASS group, which ran weekly exercise classes using the hospital's hydrotherapy pool and gym and taught by physiotherapists with a keen interest in AxSpA. The collected data were analysed and mean values calculated.

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Back on Track patient          Patient seen by GP  ←→  HCP education
education programme                                      programme
      │                                                     │  ↑ ↓
Developed by Whipps                Other referral (MSK
  Cross EIBPS                    community services and
                                  secondary care referrals)
      │                                  │
Inflammatory back pain ←  Back pain presentation for  →  Mechanical back pain
      │                      3 months or longer                  │
Refer to Early                                          Refer to appropriate
Inflammatory Back Pain                                  specialist or maintain in
Service (EIBPS)                                            primary care
      │                          NO  →  Other possible sources of
Patient assessment: is            │         back pain/red flags
history suggestive of IBP/     Mechanical           │
spondyloarthropathy?              │              Consultant
      │                    ┌──────┴──────┐          review
    YES                Advice + D/C    Physio + D/C  ←────┘
      │
   SIJ X-ray  →  Radiographic sacroiliitis              NO
                  ┌──────┴──────┐                        ↑
                YES            NO
                 │              │
              AxSpA         MRI SIJs and
            (suspected)        spine
                 │              │
           Assess disease   Evidence of sacroiliitis or
                 │          inflammatory spinal
           Consider treatment    changes
                 │              │
           Conventional      3-month review if on        Fail treatment
           treatment          biologics                     │
                 │              │                      Refer to centres
           Consider biologics  Responds to treatment   undertaking
                 │              │                      clinical trials
                              3-monthly
                              assessment
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Figure 1: Early Inflammatory Back Pain Service (EIBPS) model.
GP: general practitioner; HCP: healthcare professional; MSK: musculoskeletal; EIBPS: Early Inflammatory Back Pain Service; IBP: inflammatory back pain; AS: ankylosing spondylitis; AxSpA: axial spondyloarthritis; MRI: magnetic resonance imaging; SIJ: sacroiliac joint.

RESULTS

Referral Guidelines

Between June 2010 and June 2013, a total of 222 patients were referred into the EIBPS by primary care doctors (n=207), extended-scope practitioners (physiotherapists) (n=3), and orthopaedists (n=12). Three patients were lost to follow-up and therefore excluded from the analysis.

Patient Characteristics

The mean age of all patients referred was 34 years (range: 16-64) and 50% were male (Table 1). Of the patients screened by the EIBPS, 64% had IBP and 48% of the patients presenting with IBP or >1 SpA feature (iritis, psoriasis, IBD, peripheral arthritis, dactylitis, family history of SpA) had a diagnosis of AxSpA.

Screening

The mean waiting time for a first new appointment with the EIBPS was 16 days, with 82% of patients seen within 3 weeks. In total, 142 patients (64%) fulfilled the Berlin IBP criteria. Mechanical back pain (MBP) was present in 80 patients (36%). A total of 149 patients (67%) were referred for an X-ray of their SIJs: 142 patients with IBP (100%) and 7 patients with MBP (3%) who did not fulfil the Berlin IBP criteria but had other features suggestive of spondyloarthropathy. Fourteen of these patients (9%) had a pre-existing diagnosis of AS (radiographic AxSpA) confirmed on plain films. A total of 41 of the 149 referred patients (28%) were given a new diagnosis of radiographic AxSpA following their X-ray. A total of 93 patients with normal or equivocal X-ray findings were referred for an MRI scan of the whole spine and SIJs in order to investigate further. Sixteen patients (17%) displayed findings suggestive of nr-AxSpA. A new diagnosis of AxSpA was made in 26% of all referred patients (Figure 2).

Diagnosis Delay

The median duration from the first onset of back pain to diagnosis of AxSpA was 3.1 years (range: 0.25-30; mean: 5.8 years), was 2.5 years (range: 0.25-20; mean: 5.3 years) for diagnosis of nr-AxSpA, and was 4.0 years (range: 0.25-30; mean: 6.0 years) for diagnosis of radiographic AxSpA.

Commencement of Treatment

At the time of diagnosis, 96% (n=68) of the AxSpA patients were taking NSAIDs. All patients (100%; n=37) that met NICE criteria for anti-TNF therapy were offered treatment, with 84% (n=31) passing screening and 45% (n=14) starting treatment within 6 months of their first appointment with the EIBPS. Treatment onset was delayed in the remaining 17 patients due to positive tuberculosis screening results requiring prophylactic treatment, and due to patient delays over discussion and consent.

Cost Analysis

The added cost of the service to our practice was a funded, 0.5 part-time senior physiotherapist (£18,000 per annum) who was trained by attending consultant-led AS clinics and then mentored in establishing early AS clinics for 6-9 months. Patients were gradually transferred from other general clinics to the specialist by generating a referral pathway for primary care, and this had no additional cost burden.

Table 1: Referred patient characteristics.

Patient group	Mean age (range), years	Males, %
All patients (n=222)	34 (16-64)	49.5
All IBP patients (n=142)	33 (16-61)	57.7
Existing radiographic AxSpA patients (n=15)	37 (23-50)	71.4
New diagnosis nr-AxSpA (n=16)	28.5 (16-42)	62.5
New diagnosis radiographic AxSpA (n=41)	35 (17-61)	70.0
New diagnosis peripheral SpA (n=5)	33.8 (29-40)	80.0
Lost to follow-up (n=3)	34.3 (29-43)	0

IBP: inflammatory back pain; AxSpA: axial spondyloarthritis; nr-AxSpA: non-radiographic axial spondyloarthritis; SpA: spondyloarthritis.
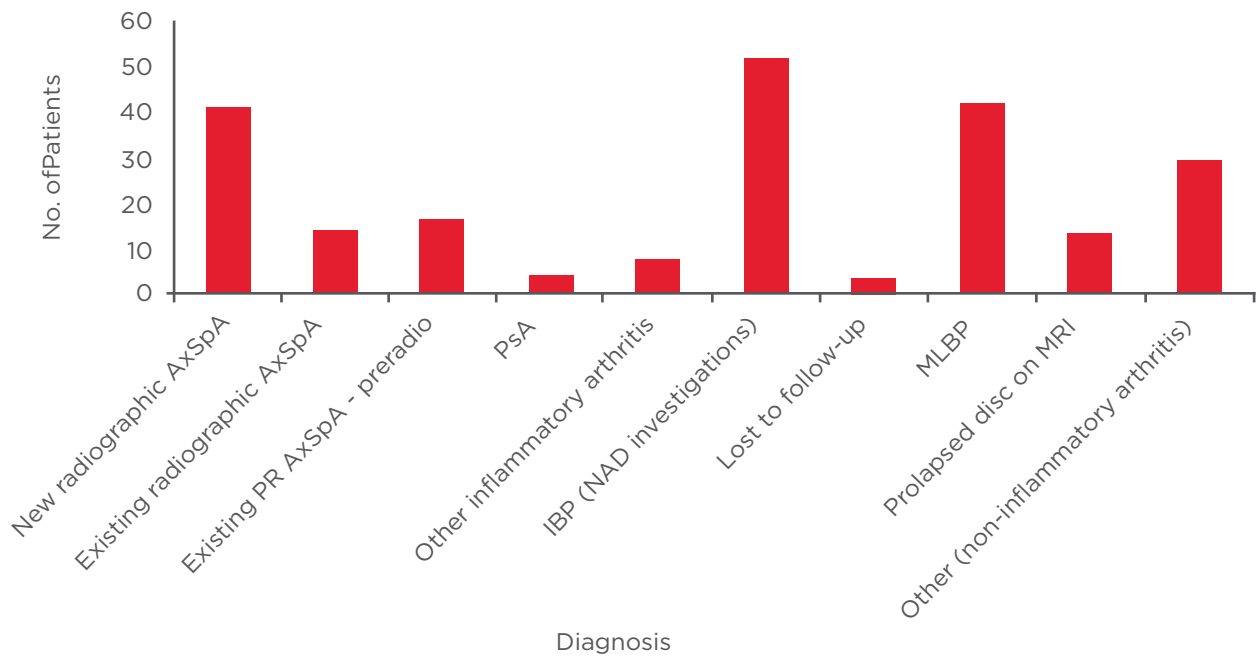
Figure 2: Diagnosis of all patients referred into the EIBPS (n=222).
IBP: inflammatory back pain; AxSpA: axial spondyloarthritis; PsA: psoriatic arthritis; EIBPS: Early Inflammatory Back Pain Service; MRI: magnetic resonance imaging; MLBP: mechanical low back pain.

DISCUSSION

The Whipps Cross' EIBPS provides an efficient and feasible best practice model based on the NASS 'Looking Ahead' recommendations for diagnosing and managing AxSpA. Almost two-thirds (64%) of patients referred into the service fulfilled the Berlin criteria for IBP. Further investigations revealed that almost half of these patients (48%) fulfilled the ASAS criteria for a diagnosis of nr-AxSpA or radiographic AxSpA. The overall service yield for diagnosing AxSpA from the applied referral parameters, combined awareness campaigns, and primary care education is high (38%), with an additional 9% having confirmation of a pre-existing diagnosis of radiographic AxSpA. Several recent studies have investigated referral strategies in different countries,[20-23] as delayed diagnosis results from difficulty in identifying IBP.[20] The diagnostic yield for AxSpA is higher when referral parameters, such as imaging and HLA-B27, are included over clinical features alone (41.8% versus 36.8%).[20] However, the authors note that including investigations within referral guidelines may result in inappropriate tests and imaging in primary care. Differentiating IBP from MBP in a busy GP clinic with simple questions provides a valuable screen for SpA and onward referral to specialist care.

Our EIBPS demonstrated a low median delay in diagnosis of 3.1 years. Mean diagnosis delay (5.8 years) was reduced significantly over routine UK rheumatology departments.[11] Brandt and colleagues[24] also demonstrated a shortened mean symptom duration of 7.7 years from initial onset to diagnosis when applying referral parameters in orthopaedics and primary care. We are unable to say whether the addition of a GP education and community awareness campaign assisted earlier diagnosis, but we are unaware of another UK study with a median delayed diagnosis below 5 years. The recent use of ASAS criteria that combine clinical, laboratory, and imaging parameters to diagnose patients early may influence the reduction in delay that we report. Despite the significant improvement observed in our cohort, a median gap of 3.1 years (mean: 5.8 years) for formal diagnosis is still disappointing, with a majority of patients still diagnosed with irreversible radiographic damage. It is reasonable to hypothesise that the next few years may yield greater reductions in diagnosis delay as the effects of the IBP awareness campaign filter through the system. Nevertheless, the efforts to promote awareness of AxSpA to frontline HCPs and secondary care should continue. A limitation of this study is that subjective questioning to identify IBP was collected within routine appointments by a specialist physiotherapist and not necessarily

using a standardised questionnaire. The authors attempted to limit bias by using a single, trained physiotherapist for all assessments.

Ensuring patients with AxSpA are managed within specialist services in rheumatology and have access to an expert multidisciplinary team with experience in inflammatory arthritis is a key recommendation in the 'Looking Ahead' publication.[7] The EIBPS provides regular disease monitoring of patients by a consultant rheumatologist and specialist AS physiotherapist and opportunities for patients to attend an educational and exercise group course, as well as ongoing weekly exercise and hydrotherapy sessions run by the NASS and Trust physiotherapists.

The EIBPS demonstrates that prompt access to drug treatments, such as NSAIDs and anti-TNF therapy, is possible. In our cohort, 96% of the AxSpA patients were taking NSAIDs at diagnosis. Supportive evidence showing that NSAIDs may slow the progression of spinal bony changes in AS now exists,[5,12,25] especially in patients with elevated acute-phase reactants, and, as such, a risk/benefit analysis should be performed for each individual patient. Furthermore, anti-TNF therapy has consistently demonstrated symptom control, with work and lifestyle benefits in patients with radiographic AxSpA.[26,27] All patients should be evaluated for anti-TNF therapy as recommended by the NASS 'Looking Ahead' initiative, and

as demonstrated within our service. Timely commencement of biological agents is essential in those patients fulfilling the NICE criteria. Almost half of our patients started anti-TNF therapy within 6 months of their first consultation with the EIBPS.

The EIBPS model provides a cost-efficient and replicable service for patients with suspected IBP, and diverts patients out of general rheumatology clinics and into a specialist service providing prompt and accurate diagnosis and management. There was a significant reduction in diagnostic delay in our cohort and the added costs we demonstrate for such a service should not deter commissioners or trust boards. We recommend that all trusts consider this best practice model in conjunction with primary care education within the local catchment area in order to raise the profile of IBP.

KEY MESSAGES

i) Delay in the diagnosis and management of AxSpA continues to be a major issue in the UK.

ii) IBP service pathways, supported in the NASS 'Looking Ahead' recommendations, facilitate the early diagnosis and management of AxSpA and shorten diagnostic delay.

iii) Our best practice model provides a feasible, cost-effective pathway for the development of other EIBP services.

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