Report on the 5th Annual Scientific Meeting of BritSpA

Held at the Park Regis Hotel, Birmingham,
14-15 September, 2022
Report written by Michael Mallinson

The meeting was chaired by Dr. Aisling Coy and Mr. Chris Martey, who provided the opening welcome and introductions.

The first presentation was by Dale Webb. It was similar to his presentation at the ASIF Council Meeting, but because it is a wonderful example of what a patient organization can achieve, I have reported it in full.

National Axial Spondyloarthritis Society Update
Dr. Dale Webb, CEO

"Together we can drive down diagnosis times and catalyse improvements in care."

The theme of Dale's talk was partnerships. NASS is seeking to extend partnerships in primary and secondary care as it tries to bring to life its ambitions of a Gold Standard time to diagnosis and effective care for every patient. BritSpA is an important part of this and NASS building a social movement for change.

Dale specifically addressed three NASS programs.

1. **Aspiring to Excellence Program**. This program was formed to bring a Quality Improvement (QI) approach to axSpA. The program brings rheumatology teams together to work with experts in service improvement, and to collaborate on the planning and implementation of projects that will transform healthcare for people with axial SpA. It is a strategic partnership between NASS, BRITSpA, the NHS Transformation Unit, and sponsors.

In regard to QI, Dale advised that the first two episodes of "**Rheum for Improvement**", a NASS podcast dedicated to service improvement in axSpA care, are now available and are CPD, Continuing Professional Development, accredited. As the program comes to maturity there will be more and more podcasts coming out showing how rheumatology can use QI approaches to improve the time to diagnosis and patient care.
https://tunein.com/radio/Rheum-For-Improvement-p1906918/

The Aspiring to Excellence program now involves 19 hospital rheumatology teams, which will focus on trying to achieve the Gold Standard using the NASS 'Act on Axial SpA' framework. This involves using the Route Map published in June, 2021, and a new Gold Standard Audit Tool that will track the time from symptom onset until diagnosis. There is a data set of only a few hundred patients at the moment, but the program wants to create a much larger data set to really understand and track performance in the time to diagnosis, touching on each of the data points on the patient's journey to diagnosis to allow for

intervention at those points. The Audit Tool consists of a standard survey tool with ten questions. It will create a comprehensive baseline across the program and give a repeatable, standardized, and comparable ongoing measurement framework.

As an aside, Dale mentioned that NASS is thinking of creating the first-ever national axSpA QI conference.

As part of the Aspiring to Excellence program, NASS has commissioned a report based on a survey of 900 patients, "What do Patients value and need in the diagnosis, treatment and care of axial spondyloarthritis?" The report will be launched shortly. It may make some uncomfortable reading for clinicians, but the research is clear. Patients know what they want. NASS will develop, with patients, some quality standards that are currently being tested and will be launched next year. The plan is to influence NICE, ASAS and EULAR with a patient view of quality that will sit alongside a clinician's view of quality.

Dale touched on the gender inequalities in axSpA diagnosis and care uncovered in the Patient Values research. On average women wait two years longer than men for a diagnosis. 61% of women (compared to 43% of men) didn't feel they were believed by their health professionals when they were seeking a diagnosis, and twice as many women than men felt like their health professional was not committed to finding the true source of their pain.

https://nass.co.uk/homepage/health-professionals/aspiring-to-excellence/

2. **Act on Axial SpA Campaign.** Phase I of the campaign has been completed, so Dale focused today on how to raise clinical visibility in primary care for axSpA and how to increase clinical leadership. The answer is that NASS has launched its **Champions in Primary Care** program to activate a cohort of primary care physicians who will be involved in a two-year leadership development and quality improvement program. They will work together in a national network to use QI methods to unlock local problems, draw out learnings, and provide feedback on national policy.

To date, there have been 12 Primary Care Champions appointed. They will participate with rheumatology departments to spread learning across healthcare systems to help others adopt change. They cover quite a lot of the country, but not all of it yet.

NASS asked the Norfolk and Norwich University Hospital to do a study on the cost of the delay to diagnosis in axSpA. Costs are those to the individual, the economy, and the National Health Service (NHS). The average cost to the individual is £193,000! With the Gold Standard in place, this cost drops to £26,000, a savings of £167,000. And what is the cost to the economy? Dale advised we will have to wait until 12 October to see the figure.

Note: the cost figure released in October is £18.7 billion per year.
https://www.actonaxialspa.com/delay-to-diagnosis/

In terms of further partnerships, NASS is undertaking an axSpA landscape review in dermatology, gastroenterology, ophthalmology, and radiology. These reviews will be published to make the case for change and improvement in secondary care.

Lastly, Dale addressed how to bring all these things together and create a high-dosage intervention that tackles public awareness, primary care, secondary care, and rheumatology. NASS has asked for expressions of interest to co-create with it an integrated pilot to test all four Gold Standard interventions concurrently in one health economy. It is hoped the pilot testing will allow for the full implementation of the interventions in 2024.

https://www.actonaxialspa.com/integrated-pilot-for-act-on-axial-spa/
https://www.actonaxialspa.com/

3. **APPG – All-Party Parliamentary Group.** This group is an important part of all the work that is being done. Another meeting of the group is scheduled for 16 October, 2022 to review the state of the nation. NASS will be repeating its Freedom of Information request asking how well the NICE guidelines are being implemented. Lastly, NASS will be publishing information on 30 November, 2022 at a special parliamentary reception.

Page 15 - https://www.actonaxialspa.com/wp-content/uploads/2022/10/NASS-Impact-Report_DIGITAL-WEB-FRIENDLY-FINAL-1.pdf

The next item on the Agenda was some research updates.

BAxSIC
(British Axial Spondyloarthritis Inception Cohort)
Dr. Helena Marzo Ortega.

The aim of the research is to provide real-world data on axSpA in the UK. There is a huge unmet need in Britain. Every European country has got a long-standing cohort providing a wealth of data for their respective health services. But in the UK, the BSRBRAS cohort was cut short, so BAxSIC was set up as a virtual cohort. Patients provide their outcome results which will be followed for three years, to begin with. Initially, there were some funding issues, but BritSpA and NASS have stepped up to be the main collaborators.

DyNAMISM
Prof. Gareth Jones

This study addresses whether NSAIDs reduce the appearance of Sacroiliac Joint Bone Marrow Edema (BME) in axSpA. The hypothesis is that among patients with axSpA the use of NSAIDs will lead to an underestimation of the occurrence of sacroiliitis and/or the severity of sacroiliitis as assessed by MRI.

The current practices regarding whether patients should 'wash-out' of NSAIDs before MRI are variable. The lack of clear guidelines gave rise to the study. In the study, patients were

kept off NSAIDs prior to their MRI scans. Gareth explained the full methodology of the study and the baseline characteristics. On the first scan, 50% of patients were positive for sacroiliitis. After six weeks back on NSAIDs another scan was done. This showed 75% of the positive patients were still positive, but 24% were negative.

Because the study showed that in 1 in 4 patients NSAIDs masked evidence of inflammation, the recommendation for MRI is that if the patient is willing to do so, they should wash out prior to MRI. The majority of patients can tolerate going off NSAIDs for a short time, although there is a small increase in disease activity and pain.

British Society of Rheumatology Guidelines
Prof. Karl Gaffney

It has been six years since the last publication of the BSR/BHPR axSpA guidelines. Karl is Chair of a working committee that is being put together to look at a third update, which is necessary because the last update was before the approval of newer drugs and focused on THF Inhibitors.

The guidelines will address only pharmacological treatments for axSpA because EULAR, in the recent update of its recommendations, did a systematic literature review and did not find much for non-pharmacological treatments.

The working committee will wait until after IL-17A/F and JAK Inhibitors are approved by NICE before publishing the updated guidelines. This is to distinguish the BSR guidelines from the ASAS-EULAR guidelines.

After a break, the meeting continued with the presentation of prize-winning abstracts and the presentation of the prizes.

Clinical Science Abstract
"Predictors of sustained remission in people with axSpA treated with biological drugs."
Dr. Bayram Farisogullari

Remission is the key treatment goal, but yet there is no consensus definition of remission in axSpA although ASDAS-ID (ASDAS score of <1.3) and ASAS-PR criteria are widely accepted remission-like disease activity states in axSpA.

Remission leads to better health outcomes and reduces the long-term risk of structural changes, so the goal of the study was to determine predictors of sustained remission in people with axSpA after treatment with their first bDMARD, and see if these aligned with baseline predictors established from a systematic literature review.

Bayram explained the methodology of the study, for which 2,667 SpA patients were recruited, of whom 1,855 had axSpA (86% with r-axSpA, 14% with nr-axSpA). The results confirmed the literature on this topic; patients in sustained remission (30% of the study group) were younger, had earlier disease onset, were more frequently male, had lower BMI, and were more frequently HLA-B*27 positive.

In the sustained remission group, at the start of taking a biologic, these patients had a lower BADAI, BASFI and VAS (0-10)-PGA scores, and lower pain and fatigue, while their ESR and CRP were higher compared to the non-remission group.

In conclusion, patients in sustained remission after starting their first biologic have distinctive characteristics compared to patients not in remission. These data can be used to aid the clinical and personalised management of axSpA and can facilitate better communication between healthcare professionals and patients regarding the course and prognosis of their condition.

70% of patients in the study did not achieve remission on their first biologic, with remission defined as above. There needs to be a standard definition of sustained remission.

Basic Science
"Exercise as an anti-inflammatory treatment in axSpA:
A proof-of-concept study."
Dr. Matthew Roberts.

This study looked at the anti-inflammatory effects of exercise, specifically the action of monocyte subsets. Monocytes are a type of white blood cell that helps fight infection. Their subsets are Classicals, Intermediates and Non-Classicals, which can be distinguished by a procedure.

The CD16+ subsets are of particular interest because they exhibit inflammatory properties and greater production of pro-inflammatory cytokines. Marked reductions in CD16+ monocyte populations have been noted during weight loss and with physical activity in other populations but not in axSpA patients.

The purpose of the study, which was a randomised control trial, was to see whether exercise reduced the relative percentage of CD16+ monocytes in response to 12 weeks of home-based walking in axSpA patients who were not exercising regularly.

Matthew explained the methodology of the study and how flow cytometry was used for cell washing and counting. The preliminary findings suggest that regular walking (30 minutes a day, five times per week) reduced pro-inflammatory immune cell populations in axSpA which coincides with favourable BASDAI, BASFI and spinal pain responses compared to a control group.

The study highlights the importance of regular exercise to improve the underlying inflammatory profiles in patients with axSpA.

This was an interesting abstract to be presented when it was. In light of Karl Gaffney advising that the updated BSR Guidelines would only be for the pharmacological treatment of axSpA, Dale Webb has expressed dismay that non-pharmacological treatments were excluded. There had been quite a bit of discussion about this, the BSR Guidelines being defended because of the lack of evidence for non-pharmacological treatments. And then this abstract was presented!

Service Delivery & Improvement
"NAFLD in Spondyloarthritis: Identifying patients on therapy at high risk."
Dr. Stephanie Harrison

This study dealt with Spondyloarthritis patients who have psoriatic disease and therefore have a 1.5-3-fold increased prevalence of Non-Alcoholic Fatty Liver Disease. NAFLD, if untreated, can lead to irreversible liver fibrosis and hepatocellular carcinoma. Methotrexate used to treat PsD (PsO and PsA) can cause liver abnormalities.

The study screened a number of consecutive patients visiting the Leeds Specialist Spondyloarthritis Service. Each patient was assessed for a number of factors. The conclusions of the study were that PsD patients have a higher prevalence of liver disease compared with other rheumatological conditions and that PsD patients with a higher FIB-4 score also frequently had higher fibroscan scores and a diagnosis of fibrosis/cirrhosis. Further work is required to validate the findings and develop new pathways for assessing the risk of liver disease in PsD patients.

After a break, the meeting continued with a presentation.

Misdiagnosis in AxSpA.
Dr. Lianne Gensler

While not having any hard evidence for it, Lianne 'feels' there has been a tilt towards more misdiagnosis in the past twenty years. In 2002 there was a lot of under-diagnosis, whereas in 2022 there is a trend of over-diagnosis, with under-diagnosis still happening. And, incorrect diagnoses are happening as well.

Why does misdiagnosis occur? There are knowledge gaps, and there are cognitive biases in clinical reasoning including confirmation bias (for example, interpreting data to conform to one's beliefs), anchoring bias (e.g. prioritising data that supports the initial impression), diagnostic momentum (e.g. accepting a diagnosis without validating it), and affect heuristic (e.g. allowing emotions to overrule the data).

There is not much literature on misdiagnosis. Lianne, therefore, relied on some case studies from her practice to illustrate her talk. In going through four case studies, the common elements were the misuse of ASAS classification criteria as diagnostic criteria, overlooking signs of axSpA, and misjudging MRI readings.

The cases were interesting and showed the difficulty of diagnosing axSpA. In the first case, a pregnant woman was referred for sacroiliitis on MRI. This proved to be Bone Marrow Edema from the pregnancy. In the second and third cases, there were signs of SpA such as lower back pain, Crohn's Disease, uveitis, and positive for HLA-B*27. But the two cases were finally resolved as Sacral Insufficiency Fracture and Osteomyelitis associated with Crohn's Disease.

The fourth case was a young man who was already diagnosed with axSpA, but after an examination and MRI was diagnosed with Acute Lymphocytic Leukemia.

The lessons from the cases were that post-partum women and healthy young athletes often show BME in the SIJ; that physical examination may not reveal MSK abnormalities in axSpA, and that MSK complaints are a common manifestation of hematological malignancies in children.

As a last remark, Lianne recommended becoming an expert on reading MRIs. She recommended four MRI slices, T1, STIR, coronal obliques, and axial obliques. The axial obliques should be done as a matter of common procedure as they are very useful in diagnosing other conditions.

Day 2

Day 2 started with a mini-symposium on bone health, important in axSpA because of the higher risk of fractures.

Advances in fracture risk assessment and osteoporosis management.
Prof. Nick Harvey

Fractures are a large burden of disease, with the situation getting worse as the population ages. There are large treatment gaps in people at a high risk of fracture, with women in particular not getting the interventions they need. There are also shortfalls in the healthcare system for dealing with fractures.

FRAX, the Fracture Risk Assessment tool (https://www.sheffield.ac.uk/FRAX/) is useful for identifying individuals at high risk for fracture. There is evidence that screening can reduce the incidence of hip fractures. There is a need to screen for high-risk fracture individuals through primary care, start treatment for them and save the health system money.

Bone Health in AxSpA.
Dr. Gavin Clunie

Bone is a key organ target in SpA because of increased bone turnover, generalised bone loss and fragility, erosions, osteitis, and enthesitis. The implications of these are pain, deformity, loss of function, the risk of fractures, and fractures themselves. The likelihood of vertebral fractures occurring in AS is up to four times the risk compared to control groups. 67% of AS patients who have spinal fractures have neurological complications, and 3% die within three months. There's a relatively high number of fractures in the cervical spine.

For clinical purposes, doctors need to be aware of mechanical-type back pain in patients who are used to reporting inflammatory back pain. Spinal fractures cannot be identified without imaging.

Gavin also examined the role of biologics on bone health. This was a complex discussion but in summary, the reduction of systemic and spinal inflammation is likely to be a key goal of successful anti-fracture management.

Role of Physiotherapy in maintaining
Bone health in AxSpA.
Sarah Legg, PT.

Echoing the previous speaker, Sarah said that altered bone metabolism with chronic inflammation leads to both new bone formation and increased bone loss. There were some sobering facts. Fragility fractures are the fourth leading cause of chronic disease morbidity in Europe and vertebral fractures can have an even bigger impact on quality of life than hip fractures. Some 10%-20% of patients with hip fractures who were community-dwelling require long-term nursing care after the hip fracture. Vertebral fractures are more common in axSpA but are underdiagnosed. 1 in 4 people who experience a fracture will have another within five years and 1 in 10 will have a fracture of another limb within five years.

In Bath, where Sarah works, there is a two-week residential course for people with axSpA which includes evidence-based education on bone health, tailored exercise, rehabilitation and long-term condition management. They want patients to understand osteoporosis, its microarchitecture, how bones turn over, and how the team of osteocytes, osteoclasts and osteoblasts can be affected by external factors such as strain on the bone from exercise. They talk about risk factors for fractures, including those that are modifiable.

Exercise and activity are good for bone health, but what movements are best? The answer is exercises that are strong (involving muscle resistance and weight-bearing), steady (involving balance and muscle strength for falls prevention), and straight (involving back muscle strength for posture and pain).

Strength exercises challenge muscle which exerts a force on bone and provides a site-specific benefit. Compound exercises, which use a group of muscles, are beneficial. Sarah warned about introducing exercise appropriately and talked about how to engage people in exercise for bone health. Novelty in exercise is beneficial, and while weight-bearing exercise has not been shown to improve bone density, a lack of it can decrease bone density!

Sarah finished by saying that there needs to be a consistent message to axSpA patients that they need to move. A multicentre randomised trial of 100 patients showed that high-intensity exercise for three months reduced disease activity in axSpA.

https://theros.org.uk/information-and-support/osteoporosis/living-with-osteoporosis/exercise-and-physical-activity-for-osteoporosis/

After a break, the agenda continued with a state-of-the-art lecture.

Therapeutics in Axial Spondyloarthritis.
Prof. Dr. Denis Poddubnyy

The lecture started with a case study of a 24-year-old male with IBP suggestive of axSpA. An x-ray is inconclusive, which is the reason that Denis says we need to move to MRI. X-rays are neither specific nor sensitive to a diagnosis of axSpA, and Denis wants to see inflammation to confirm the diagnosis. With MRI we can see BME on STIR and structural damage on T1, so the MRI is indicative of axSpA. But what about treatment? In this case, the patient has not been responsive to NSAIDs. So, what is the treatment?

We live in the era of treat-to-target (T2T) where the primary treatment target in axSpA is remission or low disease activity defined as the absence of clinical and laboratory markers of inflammatory activity. The objective of treat-to-target is to reverse reversible disability due to inflammation and to prevent irreversible structural damage.

We have a very good tool for measuring disease activity, ASDAS (Ankylosing Spondylitis Disease Activity Score), where a score of <1.3 indicates inactive disease, <2.1 indicates low disease activity, and higher scores indicate high or very high disease activity.

Denis hoped everyone agreed that treat-to-target, where we have the tool to measure progress, is a good therapeutic objective. However, it is a bit surprising that in America there was a 2019 update from ACR/SAA/SPARTAN recommending against using treat-to-target in axSpA. Denis feels that this is a misunderstanding of what treat-to-target is and that a fear of doctors treating on numbers and not on how the patient feels is misplaced.

There has only been one study, the TICOSPA study, on comparing treat-to-target with usual care. The results of the study were negative for a few reasons. One was that in the T2T cohort, treatment was automatically escalated when ASDAS of <2.1 was not met, which is not strictly what T2T means. Also, there was an unusual primary endpoint, a 30% improvement in the ASAS Health Index. This has not been tested in other trials and the meaning is unclear. Further, for the usual care cohort, they were recruited in expert centres

where you would expect the level of care to be fine. There were some numerical differences between the two groups. On the whole, the Usual Care route is doing quite well.

Denis thinks that the concept of T2T is important. It's desirable to achieve a lack of symptoms and inflammation, with the treatment process being adjusted as needs be to achieve it.

Denis next turned to the ASAS-EULAR recommendations for the management of axSpA. These were originally drafted in 2016 but were recently updated at EULAR to include JAK Inhibitors with THF Inhibitors and IL-17 Inhibitors as treatment options. These drugs all have similar efficacy in axSpA. A new drug, bimekizumab, a humanized anti-IL17A, anti-IL-17F, and anti-IL17AF monoclonal antibody seems to have the same response as IL-17A.

In multiple clinical trials for people with axSpA, there has been a positive response to TNF Inhibitors, IL-17A Inhibitors, and JAK Inhibitors. If you are thinking of choosing a drug for patients who are not responding to NSAIDs, all of these are effective. However, depending on the patient and their extra musculoskeletal manifestations, some bDMARDS and tsDMARDs may be preferable to others.

The updated ASAS-EULAR recommendations include new Recommendation 11. The absence of a response to treatment should trigger a re-evaluation of the diagnosis and consideration of the presence of comorbidities. Denis also noted that if you cannot confirm the inflammatory nature of back pain, you should not prescribe TNF, IL-17 or JAK Inhibitors.

Finally, inhibition of structural damage in axSpA is possible by early, effective and continuous inhibition of inflammation. NSAIDs work to minimally retard the radiographic progress of axSpA, but safety concerns rule out their continuous use. TNF Inhibitors have been shown to inhibit radiographic progression, but only after more than two years of use. IL-17 Inhibitors are expected to eventually also demonstrate radiographic inhibition.

The Andrew Keat Lecture followed. Andrew Keat was the first President of BritSpA, the British Society for Spondyloarthritis, as well as a founding member. He died in 2022 aged 72 after two years of illness with motor neuron disease. Prior to his death, he donated money for an Andrew Keat Lecture and Award. This is the second Andrew Keat lecture and Award.

The Andrew Keat Lecture.
What causes Spondyloarthritis?
Prof. Paul Bowness

Despite the title of his lecture, Paul said his aim is to cure axSpA! His talk was broken down into four sections.

1. SpA genetics and environment. Spondyloarthritis is an immune-mediated disease of related conditions with common clinical, genetic, and pathogenic features, characterized by Type 17 inflammation, enthesitis, and new bone formation. Understanding the

pathogenesis of SpA will improve targeted treatment, while lessons from genetics and immunology, including trials from biologic therapies, are informative.

AS is highly heritable, meaning that for any one person, the chance of getting the disease is largely genetic. HLA-B*27 is by far the strongest genetic factor, but it only accounts for 20%-25% of the contribution. There are other genetic factors. About 111 genes have been implicated by the GWAS (Genome Wide Association Studies) The next strongest genes after HLA-B*27 are ERAP 1 and IL23 Receptor. IL23R is implicated together with IL-12/23 p40 and TYK2 in Type 17 immunity. Genetic studies have highlighted the importance of the immune system and the importance of the Type 17 immune system.

We know axSpA starts in the 20s. Having said there is a big genetic load, there must be something else that is triggering the disease. The two big candidates are mechanical stress and the environment, most likely bugs in the environment and microbiome. There are studies that show the gut microbiome is different in SpA. Paul says to watch this space as the microbiome is studied more. It may be possible to manipulate the gut microbiome to treat disease.

2. Excessive or aberrant Type 17 immunity. Paul argues that psoriatic arthritis, psoriasis, iritis, and IBD are all Type 17-driven diseases related to axSpA. But while there are similarities, there are also differences (for example, you have to be careful with IL-17 in IBD because IL-17 is there to keep the intestinal lining healthy). Paul went into a very technical discussion on T Cells. They have been looking at TH17 cells in patients with SpA and it is apparent that there are differences between healthy individuals and those with SpA. SpA patients have increased numbers of TH17, cells that are capable of producing different cytokines. Based on studies that show an expansion of GM-CSF lymphocytes in the context of TH17 immunity in axSpA, Paul and others wondered if an anti-GM-CSF antibody might be a treatment option. A trial, unfortunately, showed this treatment to be ineffective, but the learnings from it have been important.

3. HLA-B*27. HLA-B*27 is a Human Leucocyte Antigen Class 1 molecule. It presents small peptide antigens to (CD8) T cells. We need HLA B*27 to fight off viruses and cancer, but how does it cause SpA? Paul presented four theories. It could present arthritogenic peptides (possibly from a bug that triggers disease or a self-peptide). It could behave badly and misfold in the cell, causing IL23 production which could drive disease. It can also misfold outside the cells on the cell surface, where it can react with other cells. These interactions change the behavior of the immune system. Lastly, it may have a role in the gut microbiome. Paul thinks that HLA-B*27 is like a volume knob that turns up the immune system.

4. What is new/hot? Single cell approaches. Single cell approaches already are hugely important in the field of rheumatology and are now starting to move to SpA. CyTOF (Cytometry by Time of Flight) and other methods make it possible to look at all the different cell types at once. Monocytes from blood and joints observed this way may be really important in SpA. Single cell approaches include RNA sequencing. Examining all the different cell types at the site of disease is what researchers would like to do.

In summary, Paul said that inflammation in SpA is multifactorial. You start with your genes and the environment (including the gut and microbiome). Then your stroma/enthesis interacts with your monocytes and Type 17 immune cells, and perhaps amplified by HLA-B*27, they talk to each other and produce inflammatory cytokines.

Break

After the break, there was a very interesting talk on the role of digital resources, which is of use to both patients and patient organisations.

IT/Digital update.
The role of digital resources to help optimise the diagnosis and treatment for patients with axial spondyloarthritis.
Prof. Raj Sengupta.

We are good at diagnosing axSpA, but we then do a broad approach to medications, which is only 30% - 60% effective. We need personalized medicine with individual characterization and tailored treatments to achieve a 70%-80% positive ASDAS response. Unfortunately, personalised medicine has not progressed that far yet. But what can technology do on the patient pathway? It can help reduce the delay to diagnosis, improve prognostication, provide a deeper understanding of the patient symptom state, improve monitoring, improve the understanding of exercise behaviors and types, and optimise when the rheumatologists should see patients.

Raj outlined the patient pathway as first, the patient has symptoms, second, the patient sees someone in primary care, then third, someone in rheumatology and fourth, receives a diagnosis. Fifth, the axSpA patient is followed-up. At each of these steps on the patient pathway, there is a technology that is helpful.

1. Person with symptoms. Social media for awareness, symptom checkers and patient diagnostic apps are available. Some of these are basic but will be far more sophisticated in the future. The problem is how to get people to the symptom checker.
https://www.actonaxialspa.com/symptoms-checker/
https://apps.apple.com/us/app/ada-check-your-health/id1099986434

2. For primary healthcare professionals, there are tools such as the SPADE tool, to assist with diagnosis and the GP Pop Up tool, which launches a pop-up via a clinical system protocol to support in consultation data collection and appropriate referral.
http://www.spadetool.co.uk/
https://www.actonaxialspa.com/introducing-an-axial-spa-gp-pop-up-tool/

3. Rheumatologists can also use diagnostic tools such as the Berlin Probability tool, an online SpA probability calculator, and the DeepSpA Tool (available only for research purposes at present) a Highly-Accurate Pelvic X-ray Classification tool to which pelvic x-rays

can be uploaded. In regard to MRIs, there is no current quantification of inflammatory changes, but this can change with the development of Deep Learning algorithms to detect sacroiliitis.
https://www.axspa.de/calculator.html
https://rad-ai.charite.de/spa

4. Patients with axSpA. There are digital technologies that can help manage, measure, and treat axSpA. There are health tracker apps that can also serve as depersonalised data collectors, and give the rheumatologist a more complete picture of their patient's progress over time. MySpA app is one such free app. These apps also include measures like BASDAI and suitable exercises. The Good Boost app provides affordable and accessible therapeutic exercise programmes, through cutting-edge technology.

Coming soon is a wearable spinal monitoring system, and technologies that enable remote spinal monitoring. The NHS Project Nightingale takes a patient-centric approach to patient self-monitoring of many things like pain, stiffness, and sleep.

Lastly, there are many patient educational materials available online as well as resources like the NASS Self-Management programme.

Eventually, Raj envisions an "Alexa" type support system for axSpA patients, which can log medications, provide reminders and information about axSpA and answer health questions.

In summary, we are at the start of a digital revolution in rheumatology care but digital tools will need to be validated in the real-world setting prior to their widespread adoption. The whole patient journey needs to be considered when designing and implementing digital solutions.

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https://www.ruh.nhs.uk/RNHRD/patients/services/rheumatology/AS_service/exercises.asp?menu_id=2

*The final presentations of Day 2 were **Year in Review** talks*

Psoriatic Arthritis
Prof. Bruce Kirkham

Bruce provided an update on the biology of PsA, new insights into enthesis from Atopic Dermatitis therapy, the updated guidelines for PsA therapies and new therapies for PsA which are continually being developed. Much of his talk was very technical and difficult for the lay person to follow.

Clinical Aspects of Axial Spondyloarthritis
Dr. Ben Thompson

Ben spoke of the clinical aspects of prognosis in axSpA, imaging, and metrology, much of which had been covered by previous speakers. The one topic he did touch on not previously covered was pregnancy and fertility outcomes in axSpA. In four European registries covering 332 axSpA pregnancies over 12 years, and where 53% of the women were on anti-TNF drugs, the adverse pregnancy outcomes were within the normal range for the general population. This study also showed that anti-TNF treatment in the third trimester did not increase the risk of adverse outcomes, but did reduce the risk of flares. It was noted that regular NSAIDs use reduced fertility in women trying to conceive.

Ben also showed a checklist for women of childbearing age living with SpA, dealing with the pre-conception period, pregnancy, and the postpartum period.

In summary, we can identify people with axSpA who are at risk of ongoing high disease activity levels. There has been progress toward a greater understanding and identification of enthesitis. There must be caution about the overinterpretation of MRI findings leading to a diagnosis of axSpA, meaning there is a continuing need to rely on clinical skills and judgement. There is a greater understanding of pregnancy and fertility issues for people with axSpA. Lastly, changes in spinal movement are greatest in the first five years of disease, which is another argument for the early diagnosis and treatment of axSpA.