

Preface Osteoarthritis

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Osteoarthritis (OA) is the leading cause of disability among older adults. It is an incredibly prevalent condition affecting upwards of one in eight adults. Societal trends in ageing, obesity and increasing joint injury will lead to a doubling of the number of persons with OA in the next decade. In this context this issue of Rheumatic Disease Clinics of North America is timely, as we envision this increasingly prevalent disabling condition in an era where health care expenditure is increasingly scrutinized.

With these societal trends, new insights are developing into the pervasive disease we know as osteoarthritis. Consideration of the impact of this condition in our society requires an understanding of the incidence and prevalence of this disease. Dr's Neogi and Zhang provide a thoughtful appraisal of the epidemiology of OA illuminating us on the how we define OA (both radiographic and symptomatic), the prevalence and incidence of OA, and risk factors for OA. As international leaders in these methods, they also highlight a number of methodologic challenges that exist in studying OA that can hamper our ability to identify pertinent relationships.

We now conceptualize OA as a disease of the whole joint organ. Critically the disease is no longer viewed as a passive, degenerative disorder but rather an active disease process with an imbalance between the repair and destruction of joint tissues driven primarily by mechanical factors. Mechanics plays a critical role in the initiation,

progression and successful treatment of OA. Dr Wilson, a true pioneer in this field, summarizes the methods for assessing joint mechanics, describes the current evidence for the role of mechanics in OA initiation and progression and further describes some current treatment approaches that focus on modifying joint mechanics.

Dr's Abhishek and Doherty provide a sagely review of the diagnosis and clinical presentation of OA with an emphasis on symptoms and signs at the key target sites. In patients with typical presentation at the target sites, clinical assessment alone is sufficient to allow a diagnosis of OA. Patients with OA should be assessed in a holistic manner which should include a targeted examination for the associated co-morbidities.

Many define OA as a condition that primarily affects hyaline articular cartilage, including William Hunter who in 1743 stated soberly "From Hippocrates to the present age it is universally allowed that ulcerated cartilage is a troublesome thing and that once destroyed, is not repaired" (1). We now conceptualize OA as a disease of the whole joint organ. Conventional radiography has played an important role in confirming the diagnosis of OA demonstrating late bony changes and joint space narrowing and has been applied as an endpoint for disease progression in clinical trials. However, OA is a disease of the whole joint including cartilage, bone and intra- and periarticular soft tissues. Thus, the importance to image and assess all joint structures has been recognized in recent years largely using magnetic resonance imaging. Lead by leaders in this field Dr's Guerhazi, Hayshi, Eckstein, Hunter, Duryea and Roemer review radiography and MRI in OA but also to give insight into other modalities such as ultrasound, scintigraphy and computed tomography (CT) and CT-arthrography and to discuss their role in the diagnosis, follow-up and research in OA.

There are a multitude of reasons a person can develop OA hence we term this multifactorial. This said, in today's society the two big risk factors for knee OA are obesity and joint injury. The risk for knee OA in our society attributed to these two risk factors accounts for approximately 80% of the reason for OA development. Both are eminently preventable, yet little is being done to reduce these risk factors (2). Similarly joint injuries such as a tear of the cruciate ligament (ACL) or meniscus increases risk of

knee OA by altering the contact mechanics of the joint environment i.e. the way weight bearing load is distributed in the joint. ACL ruptures have been found to be linked to osteoarthritic (OA) changes in 50-70% of the patients, 10-15 years following the injury (3). Dr's Riordan, Frobell, Roemer and Hunter review the pattern of joint damage that accompanies an ACL rupture and the long-term structural changes that predispose the injured knee to the development of osteoarthritis. The current evidence for the efficacy and cost-effectiveness of surgical and nonsurgical treatment strategies is also reviewed.

Sir William Osler, considered to be the "Father of Modern Medicine," once said, "When an arthritis patient walks in the front door, I feel like leaving by the back door." For many clinicians this attitude still holds true however there is much the interested clinician can do rather than nihilistic waiting. In fact there are a multitude of effective treatment options outlined in the many guidelines for management of OA and at times what is best for the individual patient can be unclear. In the face of so many choices, it would be helpful for clinicians to be able to base treatment decisions on the identification of specific clinical presentations that foretell greater likelihood of success following a given treatment. Ms Eyles, Lucas and Dr Hunter review the evidence available for patient characteristics that have been analysed as potential predictors of response to non-surgical interventions for patients with hip and knee OA.

The challenge facing clinicians is dwarfed by the experience that persons with OA have to face. Any person with a chronic illness faces a personal daily battle with the condition itself that in the case of OA is further compounded by a nihilistic "broken" health care system. Dr's Brand, Ackerman, Bohensky and Bennell provide an insightful overview of the many issues currently facing patients, health care providers, funding providers, and policy makers who are working to improve OA health outcomes. They suggest that a broad approach that considers individual and system quality of care outcomes is a useful way to identify future research and improvement opportunities.

No-one denies that the management of OA is a challenge however modern clinicians are armed with a plethora of effective treatment options. Like other chronic diseases, there is no sole treatment or cure, instead there are several strategies to use

that can help manage the condition. Clinicians who manage patients with osteoarthritis recognize that to maximize treatments, it is best to use them as part of a package and incorporate many of the strategies together. For instance, not just prescribing analgesics to manage symptoms, but also considering weight, fitness levels and muscle strength, and evaluating daily patterns of activity. For the practicing clinician arming themselves with knowledge of mechanisms and evidence for disease management is critical. It is important that symptomatic improvement serve the purpose of increasing tolerance for functional activity. Ultimately, an efficacious treatment for any progressive disorder should also control the factors and forces that drive disease progression.

Dr's Bennell, Hunt, Wrigley, Lim and Hinman provide a thorough review of the influence of muscle activity on knee joint loading, describe the deficits in muscle function observed in people with knee OA, and summarize available evidence pertaining to the role of muscle in the development and progression of knee OA. They focus on whether muscle deficits can be modified in knee OA and whether improvements in muscle function lead to improved symptoms and joint structure and conclude with a discussion of exercise prescription for muscle rehabilitation in knee OA.

The Holy Grail for many in this field is to modify the underlying structural changes to facilitate repair or reduce risk of further destruction. Dr Matthews reviews the evidence to suggest we can modify disease. This manuscript also considers the methodologic approaches and other obstacles to demonstrating efficacy of these agents in clinical trials. Unfortunately many of the trials of disease modifying agents to date have been in joints that have little if any tissue to preserve as the joint destruction of these trial participants has been quite severe. If we are to develop interventions for osteoarthritis that target the joint before it is irreversibly damaged we need to identify disease earlier and target the tissue that leads to the cascade of events we describe as joint failure.

Failing prior interventions OA surgery may become necessary. While the indications for arthroscopy have narrowed joint replacement continues to play a pivotal role in disease management. Dr Richmond reviews the plethora of surgical options and

the evidence to support their efficacy. Orthopedic surgeons continue to explore options less invasive than total knee replacement for isolated unicompartmental arthritis of the knee joint.

The prevalence of hip OA is about 9% of those aged over 65 (4) and is also expected to increase as the population ages and the prevalence of obesity rises. Like the knee, recent evidence highlights the importance of local mechanical factors in leading to hip OA and 90% or more of hip OA cases can be attributed to anatomical abnormalities (5). These anatomic/ shape abnormalities are termed femoroacetabular impingement and this insight into the cause of hip OA is one of the most important and provocative new tenets in OA (6). Dr Pun, O'Donnell and Kim review this complex area and the non-arthroplasty surgical approaches to its management.

Looking forward we are reminded by the late Sir Henry Tizard that "The secret of science is to ask the right question, and it is the choice of problem more than anything else that marks the man of genius in the scientific world". We have been afforded an opportunity to study a much maligned disease that is rapidly evolving. Let's learn from the insights our research is providing to focus even more on important modifiable risk factors such as mechanics, injury and obesity as we develop the therapeutic armamentarium of the 21st century. Assuming we maintain a meaningful motivation with the patient at the forefront of our mind we have an opportunity to make a difference in millions of peoples lives. I look forward to the evolution ahead.

I would sincerely like to thank my friends and colleagues for their valuable contributions to this issue. They were a pleasure to work with and I am sure you will see from the contents that it reflects wonderful insight and appraisal of a complex and developing field.

Reference List

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