Psoriatic arthritis: an overview

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Abstract

Psoriatic arthritis (PsA) is a chronic joint disease found on patients with psoriasis. It is one of the diseases in the spondyloarthritis (SpA) spectrum. Unlike rheumatoid arthritis, PsA doesn't have a specific biomarker to aid in its diagnosis. While its mortality is still debatable, its morbidity is not. PsA pathophysiology is nowadays more understood, but its precise mechanism is still unclear. One of the contributors is dysbiosis, which in turn lead to an increase in T helper 17 (Th17) cells that promote autoimmunity. There can be articular/periarticular and extraarticular manifestations in PsA. Currently, the best method to diagnose PsA is by using the CASPAR (Classification criteria for Psoriatic Arthritis) criteria, which has good specificity and sensitivity. To monitor disease activity, the Indonesian Rheumatology Association (IRA) recommends the use of DAPSA (Disease Activity in Psoriatic Arthritis) score. Treatment for PsA can be pharmacological and nonpharmacological. Its treatment goal is remission or low disease activity.

Keywords: psoriatic arthritis, spondyloarthritis, DAPSA, CASPAR

1. Introduction

Psoriatic arthritis (PsA) is a chronic inflammatory joint disease that develops on patients with psoriasis, with the absence of rheumatoid factor as a characteristic (Sankowski et al., 2013). Its prevalence is heterogenous, starting from 0.01% in Middle East to 0.19% in Europe. It is most frequently diagnosed between the ages of 50 and 60, but is found to have occurred between the ages of 20.5 to 84.5 (Stolwijk et al., 2016).

While studies concerning mortality in PsA yield contradicting results, patients with PsA still suffer both physically and mentally, because this disease causes pain, interference in daily functioning, and disability (Taylor, 2012). Haroon et al. (2015) also found that a longer than 6-month delay in diagnosis contributes to peripheral joint erosion, deformity, disability, and poorer long term physical function.

Unfortunately, there is still no specific laboratory test for PsA. Acute phase markers like C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) may increase, as commonly seen in inflammatory disorders, but normal values do not exclude the possibility of PsA, as Nash et al. (2018) demonstrated that they are only increased in less than 50% of the patients. Because of that, there is still ongoing research on finding biomarkers that can help diagnose and monitor disease activity in PsA.

2. Psoriatic Arthritis

2.1. Definition

Psoriatic arthritis is a subgroup of disease located in the spondyloarthritis (SpA) spectrum, alongside ankylosing spondylitis, reactive arthritis, arthritis associated with inflammatory bowel disease, and undifferentiated spondyloarthritis (Sharip and Kunz, 2020). PsA is progressive and often destructive on joints. About 20% of patients with psoriasis develop PsA (Green et al., 2020). The majority of PsA patients already have longstanding psoriasis before arthritis develops, so PsA risk factor identification in psoriasis patients and early diagnosis should be done, for they have been demonstrated to improve prognosis (Ogdie and Gelfand, 2015; Solmaz et al., 2018).

2.2. Epidemiology

PsA is the second most prevalent disease in the SpA spectrum, following ankylosing spondylitis. Its prevalence significantly correlates with age, where its peak incidence is between the ages of 50–60 (Stolwijk et al., 2016). In general, males are affected just as often as females, though some studies show little variances. Though 21.6% of adults with psoriasis will develop PsA, the prevalence of PsA in children and/or adolescents is much less, coming in at 3.3% (Karmacharya et al., 2021).

2.3. Pathogenesis

In the last decade, our understanding of PsA pathogenesis has developed a lot, but experts still debate on its precise mechanism. Most agree that PsA is a multifactorial disease, where genetic predisposition, combined with triggering environmental factors (such as infection, mechanical stress, and metabolic abnormality) and immunological factors, will activate the innate and adaptive immune systems. The activation of these systems by the stimulating Toll-like receptors (TLR) will cause the expansion of dendritic cells, macrophages, CD4+ and CD8+ T cells, neutrophils, monocytes, natural killer (NK) cells, and other cells. This expansion ultimately culminates in inflammation and damage of the skin, joint, and enthesis (Talotta et al., 2019).

In joints, synovial membrane inflammation, marked by increased vascularization and immune cells infiltration, is the main feature in PsA. The invading immune cells release proinflammatory mediators that activate fibroblast-like synoviocyte, which in turn release enzymes that damage collagen, proteoglycan, and gelatin. On the other hand, activation of the monocytic progenitor cells into osteoclasts increase bone resorption, which will cause joint deformity and loss of function. This inflammatory milieu in the synovial microenvironment favors the development of synovial pannus, entheseal inflammation, and joint damage (Veale and Fearon, 2018).

Scher et al. (2015) compared the gut microbiome composition of untreated and new-onset PsA patients with both psoriasis patients and healthy people (control group). Compared to control, PsA patients in general exhibit decreased microbiome diversity. When microbiome metabolite analysis is done, PsA and psoriasis patients is known to have less medium chain fatty acid (MCFA) compared to control. The genera *Prevotella*, *Akkermansia*, *Faecalibacterium*, and *Ruminococcus* that decrease in number in PsA and psoriasis patients have the capacity to produce short-chain fatty acid (SCFA). Among it, butyrate, has an important antiinflammatory effect. The decline of butyrate may have a role in PsA and psoriasis pathogenesis via disinhibition of local inflammatory response, which results in the damage of gut epithelium and its function in regulating the presentation of gastrointestinal antigen to immune cells and systemic circulation. Additionally, *Faecalibacterium* and *Akkermansia* can also suppress the development of T helper 17 (Th17) cells while stimulating the development

of regulatory T (Treg) cells, which play an important role in immune tolerance, production of anti-inflammatory cytokines, and preventing autoimmunity (Zhai et al., 2019; Zhang et al., 2016; Zhou et al., 2018). Dysbiosis can trigger autoimmunity, by increasing the production of Th17 cells, which will migrate from the gut mucosa and lymphoid tissue to the skin and joint, where they can cause local inflammation. Therefore, dysbiosis may be one of the connectors of genetic predisposition, in this case gut substrate that favors dysbiosis, with the activation of immune cells in PsA (Talotta et al., 2019).

2.4. Manifestation

Clinically, PsA patients can have articular/periarticular and extraarticular manifestations. The articular/periarticular manifestations include 1) peripheral arthritis with distal, oligoarticular, polyarticular, and arthritis mutilans pattern, 2) periarticular diseases such as enthesitis, dactylitis, and tenosynovitis, and 3) axial diseases involving the sacroiliac joint and spondylitis. The distal arthritis pattern affects the distal interphalangeal joints and nail is often accompanied by nail changes. The oligoarticular arthritis pattern affects ≤ 4 joints and commonly has asymmetric distribution, while the polyarticular pattern affects ≥ 5 joints, may be symmetrical, and resembles rheumatoid arthritis. Arthritis mutilans is the rarest and most destructive forms of PsA, marked by telescoping digits, bone destruction, and deformity. The extraarticular manifestations include 1) skin psoriasis, which commonly develops before arthritis, but may come together or even after arthritis, 2) nail diseases including onycholysis, pitting, and splinter hemorrhages, and 3) eye disease in the form of uveitis that is chronic, bilateral, and often involves the posterior elements (Kishimoto et al., 2021; Tiwari and Brent, 2022).

2.5. Diagnosis

The most accepted diagnostic criteria for PsA is the CASPAR (Classification criteria for Psoriatic Arthritis) criteria, which has been used since 2006. This criteria has a specificity of 98.7% and a sensitivity of 91.4%. To fulfill the CASPAR criteria, a patient must have inflammatory joint disease and at least three points from these five categories:

Table 1. CASPAR criteria

	Criteria	Point(s)
1	Evidence of:	
	- current psoriasis	2
	- personal history of psoriasis	1
	- family history of psoriasis	1
2	Typical psoriatic nail dystrophy including onycholysis, pitting, and hyperkeratosis.	1
3	A negative test result for the presence of rheumatoid factor in any method except latex.	1
4	The presence of current dactylitis or history of dactylitis.	1
5	Radiographic evidence of juxtaarticular new bone formation, excluding osteophyte, on plain radiographs of the hand or foot.	1

2.6. Management

The management of PsA can be pharmacological and nonpharmacological. For the pharmacological treatment of PsA, The Indonesian Rheumatology Association (IRA) follows the EULAR (European Alliance of Associations for Rheumatology) 2019 recommendation. The pharmacological therapy is divided into four phases, which make use of NSAID (nonsteroidal anti-inflammatory drugs), injected corticosteroids, cDMARD (conventional disease-modifying antirheumatic drugs), bDMARD (biological DMARD), JAKi (Janus kinase inhibitor), and PDE-4i (phosphodiesterase-4 inhibitor). The target for therapy is remission, or low disease activity, by means of regular disease activity monitoring, followed by appropriate dose adjustment (Gossec et al., 2020).

In American College of Rheumatology/National Psoriasis Guideline's 2018 guideline, the nonpharmacological treatment of PsA comprises low-impact (as opposed to high-impact) exercise, physical therapy, occupational therapy, weight reduction for obese patients, massage therapy, acupuncture, and smoking cessation. These interventions are only conditionally recommended due to the lack of strong evidence, except for smoking cessation, which is highly recommended (Singh et al., 2019).

2.7. Disease activity

The score recommended by the IRA to monitor PsA disease activity is DAPSA (Disease Activity in Psoriatic Arthritis). DAPSA has five components, namely tender joints (TJ) count (0–68), swollen joints (SJ) count (0–66), CRP in mg/dl, patient's assessment of disease activity (0–10), and patient's assessment of joint pain (0–10). DAPSA score is obtained by adding up all points from the five components. It is then interpreted in the following classifications: remission (0–4), low disease activity (5–14), moderate disease activity (15–28), and high disease activity (>28) (Dewi et al., 2021; Schoels et al., 2016).

3. Conclusion

PsA is not a small disease. While it is less common than many other diseases, its morbidity is not to be underestimated. Its pathophysiology is much more understood now, but the precise mechanism is still to be found. Finding this precise mechanism may help in developing a more accurate treatment strategy. While CRP is used in monitoring its disease activity, there is still no biomarker that is specific to aid in PsA diagnosis. Finding this specific biomarker may be the key to early detection and prevention of PsA morbidity.

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