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Letter to the Editor:

Title:

Evidence for a Role of Interleukin-6 in Refractory Spondyloarthritis associated Peripheral Synovitis

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Sir,

The Spondyloarthropathies (SpA) are complex polygenic disorders with mixed clinical phenotypes. Pro-inflammatory cytokines, including tumor necrosis factor (TNF), interleukin (IL)-17 and -23 play key pathogenetic roles in SpA, with their blockade being effective in many, but not all cases. Inhibition of IL-6 effectively suppresses synovitis in rheumatoid arthritis (RA)[1] but has failed to show efficacy in ankylosing spondylitis (AS), the prototype SpA, in two controlled clinical trials.[2 3] This is surprising since genetic and experimental studies indicate a potential role for IL-6 in some SpA subsets.[4-6] Here, we report our experience in 4 male patients with AS and severe, recurrent peripheral synovitis. Detailed clinical and laboratory characteristics are summarized in Table 1 but briefly they all fulfilled the modified New York criteria for AS with two cases (2 and 4) also meeting CASPAR criteria for PsA. Advanced spinal fusion and deforming asymmetrical erosive polyarthritis in peripheral joints had led to extensive replacement and reparative surgery to improve function in all cases.

All four subjects had negative CCP and RF antibodies and they had previously experienced primary or secondary non-response to multiple TNF inhibitors (TNFi). Based on limited therapeutic options at the time and the proven efficacy of IL-6 inhibition in RA associated polyarthritis, tocilizumab (TCZ) was given with dramatic effect on laboratory and clinical parameters of disease (Table 1). All cases showed objective responses in both the peripheral synovitis and axial symptoms. Tocilizumab treatment was well tolerated in all cases and is currently ongoing with a mean of 2 years exposure.

We believe that our findings suggest a role for IL-6 inhibition in a subset of cases with a clinical phenotype of aggressive, destructive peripheral arthritis resembling RA suggesting that the role of IL-6 in the pathogenesis of SpA, particularly in certain subsets merits further consideration. Indeed, genetic studies have shown evidence for IL-6R SNPs being associated with AS. Intriguingly, SNPs in the TNFAIP3 gene which codes for the A20 negative regulatory of NF kappa B have been associated with RA, psoriasis, PsA and AS.[7] An animal model with myeloid conditional knockout of A20 was originally reported to represent a model of RA which was TNF independent but IL-6 dependent.[7] However, it has been recently shown that this model starts in fact at the entheses and synovio-entheseal complex.[4] Furthermore, a study evaluating the blocking effect of IL-6 in synovial fibroblasts of eight patients with non-radiographic axial SpA showed that IL-6 expression was reduced by TCZ following fibroblast priming with TLR 2 and 4 after the in vitro administration,[5] possibly suggesting an effect for synovitis. Anti-IL-6 therapy is associated with CRP reductions and in our cases it was also beneficial in subjective outcomes of disease activity, function and pain. In conclusion, these observations point towards a possible role for IL-6 in TNF resistant axial SpA with associated peripheral synovitis. Remarkably, this phenotype has already been noted in experimental models. Further clinical studies are needed to determine whether some of the clinical heterogeneity in SpA may be related to the IL-6 cytokine pathway.

Table 1. Clinical characteristics and previous biologic exposure of cases reported.

	Case 1		Case 2		Case 3		Case 4	
Disease duration (years)	12		30		49		14	
HLA-B27	-ve		+ve		+ve		+ve	
Skin Psoriasis	N		Plaque		N		Plaque	
IBD	Crohn's		N		N		N	
Uveitis	N		Y		N		N	
Radiographic findings	Sacroiliitis		Fusion of SIJs and spine Erosive, deforming involvement of hands and feet		Fusion of SIJs and cervical spine Erosive, deforming involvement of hands and feet		Fusion of SIJs, vertebral bodies C4-C6 Erosive involvement of odontoid peg with synovitis on MRI. Erosions and new bone formation on peripheral joints	
Previous biologics and reason for discontinuation	**ADA, GOL, INF.** All stopped due to either primary or secondary non-response.		**ETA** (Auricular chondritis and GI intolerance) **INF** (Shortness of breath). **ADA** (Shortness of breath and GI intolerance) **CZA** (bloating and GI intolerance)		**ETA** (Cutaneous Pseudo-porphyria)		**INF, ADA, ETA, Anakinra, INF, Abatacept, Secukinumab.** All stopped due to either primary or secondary non-response.	
Duration of TCZ exposure (months)	62		9		38		48	
Clinical parameters and patient reported outcomes pre TCZ and after mean 6.2 month exposure	**Pre-TCZ**	**6 mo**	**Pre-TCZ**	**6 mo**	**Pre-TCZ**	**6 mo**	**Pre-TCZ**	**6 mo**
• **CRP level (mg/L)**	171	1	103	<5	26	<5	149	8
• **TJC (68)**	10	0	6	2	20	2	33	1
• **SJC (66)**	10	0	6	0	20	2	20	4

• **BASDAI**	9	NA	5.8	3.9	9.8	2.6	5.9	4
• **BASFI**	NA	NA	9.3	9.7	10	0	5	4.8
• **VAS spinal pain (10 cm)**	NA	NA	5	2	7	0	5	5

NA: not available; ADA: Adalimumab; CZA: Cimzia; ETA: Etanercept; INF: Infliximab; TCZ: Tocilizumab,

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