The Journal of International Medical Sciences Academy
2022; (April - June); Vol 35; No. 2

ORIGINAL ARTICLE

Association of Reactive Toe Nails with Radiological Plantar Enthesopathy

Mohinder Pal Singh Sawhney, Pratiksha Mishra, Shikhar Ganjoo, Simone Yadav

Abstract

Background: Reactive nail changes in the form of onycholysis, pitting, total nail dystrophy and subungual hyperkeratosis are seen in a number of autoimmune diseases like psoriasis, reactive arthritis, thyroiditis, lichen planus etc. Nail disease may be a predictor of underlying enthesopathy. **Methods:** A total of 63 patients with reactive nail changes were analysed. Detail present and past history of heel pain and examination to detect clinical enthesitis was undertaken. All the patients were subjected to radiograph of the heel lateral view to look for enthesopathy. **Results:** A total of 34 (53.97%) had clinical enthesitis in the form of plantar fascitis in 22 (34.92%) and tendoachilles tendinitis in 30 (47.62%) as compared to 52 (83.54%) with radiological evidence of enthesopathy in the form of plantar calcaneal spur/s in 48 (76.19%) and tendoachilles calcification in 33 (52.38%). **Conclusion:** All cases of reactive toe nails irrespective of the associated illness should undergo radiograph of both heels lateral view to look for underlying enthesopathy as a predictor of arthritis. In those cases, with absence of radiological changes power doppler ultrasonography (PDUS) should be performed to pick up some more cases of early arthritis.

Key words: Reactive nail, reactive arthritis, psoriatic arthritis, psoriatic nail, enthesitis, radiological enthesopathy

Department of Dermatology, Faculty of Medical & Health Sciences, SGT Medical College, Hospital & Research Institute, Chandu-Budhera, Gurugram, Haryana, 122505, India

Corresponding Author: Dr. MPS Sawhney, Professor and Head, Department of Dermatology, Faculty of Medical & Health Sciences, SGT Medical College, Hospital & Research Institute, Chandu-Budhera, Gurugram, Haryana, 122505, India

e-mail: drsawhney@live.com

Received: 23 February 2022

Accepted: 28 April 2022

How to Cite this Article: Sawhney MPS, Mishra P, Ganjoo S, Yadav S. Association of Reactive Toe Nails with Radiological Plantar Enthesopathy. J Int Med Sci Acad 2022;35(2):121-124.

Access this article online : www.jimsaonline.com

Introduction

Reactive nail has a severe impact on quality of life and may interfere with professional and other activities. In ReA (reactive arthritis), about 15% of the patients develop nail changes including thickening, subungual hyperkeratosis, onycholysis and yellow brown discoloration [1]. At some point of time, almost 90% of the patients of psoriasis presents with nail involvement. Leukonychia, pitting, red spots in lunule and crumbling results due to nail matrix involvement. Onycholysis, salmon or oil drop patches, subungual hyperkeratosis and splinter hemorrhages are due to nail bed involvement. The nail changes are often missed as they appear late than the skin lesions [2].

The term "***Enthesitis***" was introduced by La Cava in 1959. [3] Ball [4] found that enthesitis is a characteristic feature of ankylosing spondylitis in 1971. A hypothesis of enthesitis was extended to include all types of spondyloarthropathy [5]. Enthesitis is the inflammation at the attachment of tendons and ligaments to the bones. It is a common feature of psoriatic arthritis and considered to be enthesis associated disorder rather than a primary synovial arthropathy [6,7]. Inflammatory and structural change causing lytic and erosive reaction with subsequent periostitis and the formation of spurs and syndesmophytes over the years. Pain and disability are the main consequences of these but mostly planter fasciitis maybe asymptomatic. Similarly, inflammation of the tendo achilles at its attachment may lead to spur formation. The planter fascial spur occurs at the posterior inferior calcaneum and the commonest site at the medial tuberosity [5]. In 33-58% of

patients with reactive arthritis, enthesitis may be the only clinical manifestation in whom disease has been triggered by an enteric infection. Repetitive mechanical stress or more generalized inflammatory condition in spondyloarthritis may result in enthesitis. Lower extremity particularly heel is more common site for the enthesitis then those in upper limb. The predilection for enthesitis in the weight bearing and traumatized areas is due to the exposure of cryptic antigen to immune system of the body. This has been hypothesized that there is a molecular mimicry of the genetic coding of the infective organism with the host tissue antigen leading to autoimmunity. Once the cryptic antigen of the host is exposed to the immune system, there is a trafficking of the CD8 (cytotoxic) memory cell at the site of injury producing the above changes [5]. Reactive nails maybe because of the same mechanism. We are encompassing all these changes into the broad heading of 'Reactive Nails' as this an autoimmune reaction to known antigen, as is seen in Reiter's disease or unknown antigen as in psoriasis, other spondyloarthropathies. These changes like onycholysis have also been described in autoimmune thyroiditis, [8] lichen planus, [9] etc. However, the terminology reactive nail will definitely exclude all causes of infective nail disease e. g. onychomycosis, candidal nail disease etc.

There is a paucity of studies showing association of reactive toe nail/s with radiological enthesopathy. Hence, we hypothesize that if there are reactive changes in the toe nails, there maybe underlined enthesitis. Therefore, we decided to undertake a study to find out the association of reactive toe nail with underlying radiological enthesopathy.

Expected outcome of the study

By finding association of radiological enthesopathy in cases of reactive toe nails, we can predict the onset of silent reactive arthritis.

Material and Methods

An observation study was conducted in outpatient of Department of Dermatology and STD in a tertiary care hospital, from October 2020 to Dec 2021 in all the patients who were clinically diagnosed with reactive toe nail/s (onycholysis, nail pitting, subungual hyperkeratosis and total nail dystrophy). Patients having pre-existing fungal/candidal/ bacterial infection of toe nails and pregnant females were excluded from the study.

The study was cleared by Institutional Ethics Committee. A written informed consent was obtained. A detailed history especially of associated heel pain on the plantar aspect (plantar fascitis) and/or posterior aspect of calcaneum at the insertion of Achilles tendon (tendo-achilles tendinitis) which was further confirmed by examination i.e., tenderness at the site of insertion of plantar facia and tendo-achilles. All the patients with reactive nail changes were subjected to radiograph of both heels lateral view. All the data was recorded in Microsoft excel sheet. Assessment of the association of reactive nail with the plantar enthesitis and radiological enthesopathy was done.

Statistical analysis of the results was done using Chi-square test for comparing the frequencies.

Results

A total of 63 patients with reactive nail changes were analyzed. Thirty-one (49.21%) were males and 32 (50.79%) were females. Average age of the patients was 50.81 years (SD 13.49) (range 30-85 years). Type of nail involvement is as shown in Table 1.

A total of 34 (53.97%) out of 63 patients with reactive nail changes gave history of either plantar fasciitis or tendoachilles tendinitis. Clinical evidence of plantar fasciitis was seen in 22 (34.92%) cases and tendoachilles tendinitis in 30 (47.62%). Association of reactive nail with clinical enthesitis is as shown in Table 2.

A total of 52 (83.54%) patients had radiological evidence of enthesopathy. Radiological plantar calcaneal spur/s were seen in 48 (76.19%) and tendo-achilles calcification in 33 (52.38%) out of total 63 cases with reactive nail/s. The distribution of radiological changes seen is as shown in Table 3. Out of 11 cases of reactive nail/s, none had only pitted and they were spread over three groups of nail involvement. Eleven (18.97%) out of 58 cases of onycholysis, 7 (22.58%)

Table 1: Types of reactive nail

Type of reactive nail	Left only (%)	Right only (%)	Bilateral (%)	Total (%)
Onycholysis	4 (6.90)	2 (3.45)	52 (89.66)	58 (92.06)
Pitting	1 (14.28)	4 (57,14)	2 (2857)	7 (11.11)
Total dystrophic	7 (36.84)	3 (15.79)	9 (47.37)	19 (30.16)
Subungual hyperkeratosis	7 (22,58)	6 (19.35)	18 (58.06)	31 (49.21)

Table 2: Association of reactive nails with clinical enthesitis

Type of enthesitis	Left only (%)	Right only (5)	Bilateral (%)	Total (%)
Plantar fasciitis	5 (22.73)	0	17 (77.27)	22 (34.92)
Tendoachillis tendinitis	6 (20.00))	1 (3.33)	23 (76.67)	30 (47.62)

Table 3. Distribution of radiological enthesopathy in cases of reactive nail

Type of Radiological enthesopathy	Left only (%)	Right only (%)	Bilateral (%)	Total (%)
Plantar calcine spur	1 (2.08)	3 (6.25)	44 (91.67)	48 (76.19)
Tendoachilles calcification	4 (12.12)	1 (3.03)	28 (84.85)	33 (52.38)

out of 31 cases with subungual hyperkeratosis and 1 (5.26%) out of 19 cases of total dystrophic nail did not show any radiological evidence of enthesopathy. Although lesser proportion of cases of total dystrophic nail showed absence of radiological enthesopathy, the difference was not found statistically significant (Chi square 0.46, df-2, p-0.79).

Comparison between clinical enthesitis with radiological enthesopathy is as shown in Table 4. Eighteen (28.57%) of the patients who did not give any present or past history of clinical enthesitis in the form of plantar fascitis and/or tendo-achilles tendinitis were found to have radiological evidence of enthesopathy. This difference was however not found to be statistically significant (Chi square 3.77, df 1, p 0.052). In addition, two of the patients with reactive changes in the nails, who also gave history of heel pain, did not have any radiological evidence of enthesopathy.

Table 4: Comparison of clinical enthesitis with radiological enthesopathy in cases of reactive nail.

Group	Yes	No	Total
Clinical enthesitis	34	29	63
Radiological enthesopathy	52	11	63

Chi square: 3.77, df-1, p 0.052

The associated diseases with reactive nail changes are as given in Table 5.

Table 5:Associated diseases in cases of reactive nail/s

Diseases	Number (%)
Reactive arthritis	26 (41.2)
Psoriasis (Palmoplantar-5, vulgaris-3, nail-2, pustular-1)	11 (17.46)
Eczema	7 (11.11)
Lichen planus	4 (6.35)
Hypothyroidism	2 (3.17)
Chronic spontaneous urticaria	2. (3.17)
Bechet's disease	1 (1.58)
Vitiligo	1 (1.58)

Discussion

There are no studies to the best of our knowledge showing association of reactive toe nail/s with underlying radiological enthesopathy. In the available literature, there are only studies of nail psoriasis with enthesopathy by ultrasonographic assessment in the hand nails.

Krajewska-wlodarczyk et al [10] studied ultrasonic finding in 102 cases of psoriatic nail. They found that there is a direct correlation of nail plate thickness, nail bed thickness and nail matrix thickness with the extensor tendon thickness of DIP joint. Therefore, they suggested thick finger nail involvement is a predictor of psoriatic arthropathy.

However, Acosta-Felquer et al [11] found the frequency of enthesopathies in patients with psoriasis and PsA on ultrasound examination of digits with nail involvement did not differ and was 61% and 60%, respectively.

Ash et al [12] showed the relationship between the occurrence of psoriatic nails and the intensity of enthesopathies in joints other than digital suggesting that enthesitis may not be the only focal response. In the DIP joint, the thickness of the digital extensor tendon was much greater in the affected nails. Moreover, the tendon thickness increased more when onycholysis and /or subungual hyperkeratosis was present than when pitting-type changes occurred.

D'Agostino et al [13] used power doppler ultrasonography (PDUS) to study seven sites of enthesitis including insertion of plantar fascia and tendoachilles. They concluded that at least one vascularized enthesitis provided good predictive value for diagnosing spondyloarthropathy.

Our study found that in the presence of reactive toe nail/s, almost 84% will have underlying radiological enthesopathy. Further, almost 29 % of patients had no history of clinical enthesitis, thereby suggesting that silent enthesopathy can occur in a proportion of cases. Rapso and Torres [14] in their review paper in 2015 also suggested, nail psoriasis as a predictor of the development of psoriatic arthritis. Zargari et al [15] in their study in Iran in 2018 found that a significantly higher number of patients of psoriatic arthritis have nail involvement as compared to those with only psoriasis vulgaris. Similarly, Sobolewski et al [16] in their review article commented that in cases of psoriatic arthritis up to 80% have nail involvement.

Watad et al [17] in their review of available literature on the pathogenic role of enthesitis in spondyloarthropathies and psoriatic arthritis in various studies on animal models and patients opined that enthesitis is linked to nail disease as well as dactylitis.

Since almost one fifth cases with onycholysis and subungual hyperkeratosis as compared to only 5.26% of cases with total nail dystrophy did not have underlying radiological

enthesopathy, thereby suggesting that patients with total nail dystrophy are more likely to have this as compared to other two types of nail involvement.

Further, two of the cases with clinical history of enthesitis did not have underlying radiological enthesopathy, they may be cases with shorter duration of onset of disease. The process of inflammation; and dystrophic calcification and/or ossification takes time. In such cases and even in other cases of reactive nail changes without any underlying radiological enthesopathy, PDUS should be performed to pick up some more cases for early diagnosis of arthritis [13].

Conclusion

Hence, we suggest that all cases with reactive toe nail/s should undergo a simple radiograph of both heels lateral view to look for underlying enthesopathy in the form of plantar calcaneal spurs indicating calcification and ossification of plantar fascia at its insertion to the bone and also that of tendoachilles, even in the absence of clinical signs of enthesitis. Even in the absence of radiological evidence in cases of reactive toe nail changes, they should undergo PDUS to pick up some more cases of early arthritis. Thus, the reactive toe nail/s can act as predictor of onset of more serious reactive/psoriatic arthritis, thereby starting an early management for the same avoiding more serious and debilitating arthritis. Hence, we recommend that more prospective studies are required to prove this association.

Conflict of Interest:	All authors declare no COI
Ethics:	There is no ethical violation as it is based on voluntary anonymous interviews
Funding:	No external funding
Guarantor:	Dr. MPS Sawhney will act as guarantor of this article on behalf of all co-authors.

References

1. Rice PA, Handsfield HH Arthritis associated with sexually transmitted diseases In: Holmes KK, Mardh PA, Sparkling PF, Lemon SM, Stamm WE, Piot P et al, editors. Sexually Transmitted Diseases. 3rd ed. New York, McgrawHill; 1999. pp.921-935.
2. Yesudian PD, de Berker DAR. Inflammatory nail conditions. Part 1: nail changes in psoriasis. Clin Exp Dermatol 2021;46(1):9-15.
3. La Cava G. Enthesitis: Traumatic disease at insertions. JAMA 1959;169:254-5.
4. Ball J. Enthesopathy of rheumatoid and ankylosing spondylitis. Ann Rheum Dis 1971;30:213-23.
5. Francois RJ, Braun J, Khan MA. Enthesis and enthisitis: A histopathological review and relevance to spondyloarthritides. Curr Opin Rheumatol 2001;13:255-64.
6. McGonagle D, Conaghan PG, Emery P. Psoriatic arthritis: A unified concept twenty years on. Arthritis & Rheumatism 1999;42:1080-6.
7. Scarpa R, Cuocolo A, Peluso R, Atteno M, Gisonni P, Lervolino S et al. Early psoriatic arthritis: The clinical spectrum. J Rhumatol 2008;35:137-41.
8. Lause M, Kamboj A, Faith EF. Dermatological manifestations of endocrine disorders. Transl Pediatr 2017; 6: 300-12.
9. Zychowska M, Zychowska M. Nail changes in lichen planus: A single-center study. J Cutan Med Surg 2021; 25: 281-5.
10. Krajewska-W^{3}odarczyk M, Owczarczyk-Saczonek A, Placek W, Wojtkiewicz M, Wiktorowicz A, Wojtkiewicz J. Distal interphalangeal joint extensor tendon enthesopathy in patients with nail psoriasis. Scientific reports 2019; 9:3628.
11. Acosta-Felquer ML, Ruta S, Rosa J, Marin J, Ferreyra-Garrot L, Galimberti ML, Galimberti R, Garcia-Monaco R, Soriano ER. Ultrasound entheseal abnormalities at the distal interphalangeal joints and clinical nail involvement in patients with psoriasis and psoriatic arthritis, supporting the nail-enthesitis theory. Semin Arthritis Rheum 2017; 47:338-42.
12. Ash ZR, Tinazzi I, Gallego CC, Kwok C, Wilson C, Goodfield M et al. Psoriasis patients with nail disease have a greater magnitude of underlying systemic subclinical enthesopathy than those with normal nails. Ann Rheum Dis 2012;71:553-6.
13. D'Agostino MA, Aegerter P, Bechara K, Salliot C, Judet O, Chimenti MS et al. How to diagnose spondyloarthritis early? Accuracy of Peripheral enthesitis detection by power Doppler ultrasonography. Ann Rheum Dis 2011;70:1433-40.
14. Raposo I and Torres T. Nail psoriasis as a predictor of the development of psoriatic arthritis. Actas Dermo-Sifiligraficas 2015: 106: 452-7.
15. Zargari O, Kazemnezhad Leyli E, Azimi SZ. Nail involvement in patients with psoriatic arthritis in Northern Iran. Autoimmune Dis 2018;2018:4608490.
16. Sebolewski P, Walecka I, Dopytalska K. Nail involvement in psoriatic arthritis. Reumatologica 2017;55:131-5.
17. Watad A, Cuthbert RJ, Amital H, McGonale D. Enthesitis: Much More Than Focal Insertion Point Inflammation.Curr Rheumatol Rep 2018;20:41.