

# A Retrospective Study of Comparison between Dexamethasone Iontophoresis versus Intralesional Triamcinolone Acetonide in Nail Psoriasis in Same Patient

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**Abstract:** ***Introduction:** Psoriasis is a chronic inflammatory disease characterized by T cell mediated hyperproliferation of keratinocytes in the skin. Nail psoriasis may show different clinical presentations according to the structure that is involved within the nail unit. We did a retrospective study to describe efficacy of Dexamethasone Iontophoresis versus Intralesional Triamcinolone Acetonide in nail psoriasis in same patient. **Methods:** 72 patients were enrolled in the study who were given Dexamethasone Iontophoresis in right hand fingernails and Intralesional Triamcinolone Acetonide in left hand fingernails. They were followed for a period of 18 months. Patients were treated with weekly Dexamethasone Iontophoresis and monthly injections of Intralesional Triamcinolone Acetonide. **Results:** Pitting, Leukonychia, Nail plate crumbling, Lunular erythema, Onycholysis, Subungual hyperkeratosis, Salmon patch, Splinter haemorrhages were observed in both hand fingernails. Pitting was the most common finding followed by onycholysis, nail plate crumbling and subungual hyperkeratosis. The results were statistically analysed using paired "t" test. The data was presented as MEAN $\pm$ SD and p value was calculated. After the statistical analysis the "p" value was found to be significant (<0.0001) showing that Dexamethasone iontophoresis is more efficacious than Intralesional Triamcinolone Acetonide in nail psoriasis. **Conclusion:** In our study we found that Dexamethasone Iontophoresis is more efficacious than Intralesional Triamcinolone acetonide in treatment of nail psoriasis in same patient with no side effects whereas Intralesional Triamcinolone acetonide injection causes pain and atrophy of nail matrix.*

**Keywords:** Nail psoriasis, Dexamethasone Iontophoresis, Intralesional Triamcinolone Acetonide

## 1. Background

Psoriasis is a chronic inflammatory disease of multifactorial pathogenesis involving immunological, genetic and environmental causes.<sup>1</sup> Although psoriasis can present at any age, onset before the age of 30 is more common, so that most patients are affected at the most productive stage of their lives.<sup>2</sup> It affects about 2-3% of the world's population with equal sex incidence.<sup>3</sup>

Nail psoriasis has been shown to be associated with longer duration of skin lesions and higher disease severity.<sup>4,5,6,7</sup> However, it may also occur in 40% of patients with mild psoriasis.<sup>5</sup> It is slightly more common in male patients than females.<sup>6,7</sup>

Nail psoriasis may involve nail matrix leading to irregular nail pitting (the most common finding of nail psoriasis), dystrophy, and leukonychia; nail bed involvement causes onycholysis, subungual hyperkeratosis, splinter hemorrhages, oil drop patches, and nail thickening, whereas nail fold involvement may result in paronychia.<sup>1,8,9</sup>

Intralesional injections with corticosteroids are still considered to be a standard treatment for nail psoriasis.

Iontophoresis is a technique using a small electric charge to deliver medications or other chemicals through the skin. Dexamethasone iontophoresis (DI) has been widely used in various concentrations for the treatment of musculoskeletal disorders, tendonitis, temporomandibular trismus, paraesthesia, Peyronie's disease and nail psoriasis.<sup>11</sup>

We undertook this study to compare effectiveness of Dexamethasone Iontophoresis with Intralesional Triamcinolone Acetonide in nail psoriasis.

## 2. Methods

### Study Design

Retrospective study

### Participants

Patients of both genders of both genders of 18 to 70 years of age of nail psoriasis were enrolled. They were taking Dexamethasone Iontophoresis in right hand fingernails and Intralesional Triamcinolone Acetonide in left hand fingernails in the department of Dermatology, Venereology and Leprology at Muzaffarnagar medical college and hospital and they were followed for a period of 18 months in the Department of Dermatology, Venereology and Leprology at Muzaffarnagar medical college and Hospital and they were followed between February 2016 to July 2017 for a period of 18 months. A written consent was taken from all the patients after explaining all the details. These include duration of study, approval for nail photographs, application and stoppage of any kind of treatment prior to the study. Dexamethasone Iontophoresis was given in the right hand fingernails weekly and Intralesional Triamcinolone Acetonide was given in the left hand fingernails monthly. The study was preceded after taking approval from Institutional Ethical Committee.

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**Procedure**

Iontophoresis is a technique using small electric charge to deliver medications through skin. In this fingernails of both hands were placed on a metal plate which is placed into 100ml of distilled water in a shallow container with 5ml of Dexamethasone sodium solution in right shallow plastic container. 4mA of current was applied through solution for 20 minutes during each treatment. Patients were on weekly treatment and were assessed periodically.

Intralesional Triamcinolone Acetonide was given in a dose of 2.5-10mg/ml at 2 injection sites, into each lateral nail fold monthly with a 30 gauge needle and assessed periodically. Topical anaesthetic was applied prior to the injection to avoid pain.

**Inclusion Criteria**

Patients more than 18 years of age of both genders with realistic expectations and having aesthetic purpose.

**Exclusion Criteria**

Patients with Parakeratosis pustulosa, palm infection, uncontrolled diabetes mellitus, leprosy, malignancy history, CVS disorders, epilepsy and with pacemakers or other metal implants such as joint replacement.

**Assessment Criteria**

Details of percentage of improvement in signs of nail psoriasis, pitting, leukonychia, onycholysis, nail plate crumbling, oil drop, lunular red spots, splinter haemorrhages were noted with the help of visual and photographic assessment.

To assess the severity of nail lesions, Nail Psoriasis Severity Index was used which divides nail into four quadrants. Each quadrant is given a score of 1 for signs of nail matrix disease and 1 for signs of nail bed disease. The highest score possible for each fingernail is 8 (4 for nail bed plus 4 for matrix psoriasis) for a total of 80 for all fingernails.<sup>12</sup>

The number of nails affected ranged from 1-10 and a pre treatment NAPS I score ranged from 4-35 in right hand fingernails and 2-39 in left hand fingernails. The post treatment NAPS I score ranged from 0-20 in right hand fingernails and 1-29 in left hand fingernails. The response to treatment was assessed by NAPS I and patients were graded into four grades ( Excellent: 1-10, Good:11-20, Fair:21-30, Poor:31-40) with a the total score being 40 in fingernails of each hand.

**3. Statistical Analysis**

The results were statistically analyzed using SPSS version. The outcomes were compared using the chi square test. P value less than 0.05 was considered statistically significant.

**4. Observation and Results**

A total of 72 patients were studied out of which:

Right Nail Matrix(NM) pitting was present in 65.3% and Left NM pitting was present in 56.9% cases, Chi – Square  $\chi^2 = 1.052DF=1$  and  $p < 0.305$  (N/S).

Right NM Leukonychia was present in 33.3% and Left NM Leukonychia was 27.8%, Chi – Square  $\chi^2 = 0.524DF = 1, p < 0.469$ (N/S)

Lunular erythema in the NM was found to be marginally different with a value of 34.7% for Right hand and 37.5% for Left hand , Chi – Square  $\chi^2 = 0.120DF = 1$  with  $p < 0.729$  (N/S).

Nail plate crumbling in Right and Left hand was found to be equal i.e. 48.6%, Chi – Square  $\chi^2 = 0.0001 DF= 1, p < 0.0001$  (S).

Onycholysis in Right Nail Bed (NB) was found to be 51.4% while in Left NB it was 52.8%, Chi – Square  $\chi^2 = 0.028DF = 1, p < 0.868$  (N/S)

Nail bed subungual hyperkeratosis was evaluated and was found to be 48.6% in right hand and 40.3% in Left hand, Chi – Square  $\chi^2 = 1.012DF=1 p < 0.314$  (N/S)

Presence of salmon patch in Right NB was 23.6% and Left was 26.4%, Chi – Square  $\chi^2 = 0.148DF= 1 p < 0.700$  (N/S)

Nail bed showed splinter haemorrhages with 13.9% involvement of right side and 18.1% involvement on left side with Chi – Square  $\chi^2 = 1.082DF = 1 p < 0.298$  (N/S).

NAPS I was found to be excellent in 88.66% cases in right hand fingernails and 63.33% cases in left hand fingernails. It was found to be good in 13.33% cases in right hand fingernails and 25% cases in left hand fingernails. It was found to be fair in 11.66% cases in left hand fingernails.

**Table 1:** Findings showing NAPS I scoring in right hand fingernails

	Rt.Pre – procedure NAPS I	Rt. Post-Procedure NAPS I	p value
Mean	20.916	7.166	<0.001(S)
SD	7.506	3.513	

**Table 2:** Findings showing NAPS I scoring in left hand fingernails

	Lt. Pre-procedure NAPS I	Lt. Post-Procedure NAPS I	p value
Mean	26.383	11.350	<0.45(S)
SD	7.295	5.873	

**Table 3:** Findings showing NAPS I scoring in right and left hand fingernails

	Rt. Post-procedure NAPS I	Lt. Post-procedure NAPS I	p value
Mean	7.1667	11.350	<0.001(S)
SD	3.153	5.873	

After the statistical analysis the “p” value was found to be significant (<0.0001) showing that Dexamethasone Iontophoresis is more efficacious than Intralesional Triamcinolone acetonide for fingernails.

## Case 1



Pre-procedure NAPSI (L) 2 (R) 18

Post-procedure NAPSI (L) 1 (R) 6

**Figure 1:** Pre and Post procedure images of case 1.

## Case 2



Pre-procedure NAPSI (L) 10 (R) 8

Post-procedure NAPSI (L) 2 (R) 4

**Figure 2:** Pre and Post procedure images of case 2.

## 5. Discussion

Nail psoriasis has been shown to be associated with longer duration of skin lesions. Nail psoriasis is also associated with higher disease severity.<sup>5,7</sup> However, it may also occur in 40% of patients with mild psoriasis.<sup>4</sup> It is slightly more common in male patients than females.<sup>5,7</sup>

Psoriasis is a chronic inflammatory immune-mediated proliferative skin disorder that predominantly involves the skin, nails, and joints. Robert Willan, the father of modern dermatology, is credited with the first detailed clinical description of psoriasis, and hence Nail psoriasis is a frequent ailment among patients and a great source of disability. Nail manifestations can be associated with pain, altered sense of touch, and a functional impairment in dexterity resulting in an inability to grab small objects. All these conditions

culminate in restriction of daily activities, psychological stress, low self esteem, and reduced quality of life.<sup>13</sup>

Nail involvement is present in over half of patients with psoriasis and consequently has a prominent negative effect on society.<sup>14,15</sup> The clinical gummate of nail involvement is diverse and includes changes to the nail matrix, the nail bed, or both.<sup>16</sup>

The main nail matrix dystrophy is nail pitting while onycholysis, subungual hyperkeratosis, splinter hemorrhages, and oil drop discoloration are the major nail bed findings.<sup>17</sup> Lesions of the nail plate are due to the location of the disease in nail matrix as well as the duration of the disease.<sup>18</sup>

In a study conducted by Kyriakou A et al.<sup>19</sup> in 2011, out of the 225 psoriatic patients, 152 (66.7%) had psoriasis of the nails. The most prevalent features out of this population were an oil-drop salmon patch discoloration and onycholysis with 79.6% and 76.3% of the patients displaying these features, respectively. Pitting was found in 57.9% of the patients, while subungual hyperkeratosis was found in 50.7%. Crumbling of the nail was found in 41.4% of the patients. Leukonychia and hemorrhages were apparent in 28.9% of the patients, and red spots were the least common and only found in two of the patients.

Ghosal A et al.<sup>20</sup> in 2004 studied nail involvement in 100 psoriasis patients. Finger nails were involved in 32% and toe nails in 24% cases. Pitting and subungual hyperkeratosis were the most common finger and toenail changes seen in 65% and 33% cases respectively. Nail changes were more common in those with joint pain (73%) compared to those who had no joint complaints and odds ratio was 6.6. They also noted nail changes with Koebner phenomenon.

Our study had similar results as Kyriakou A et al.<sup>19</sup> and Ghosal A et al.<sup>20</sup> as in our study Pitting was present in 65.3% cases in rt. hand fingernails and 56.9% in lt. hand fingernails. Leukonychia was present in 33.3% cases in rt. hand fingernails and 27.8% cases in lt. hand fingernails. Nail plate crumbling was present in 48.6% cases in right hand fingernails and left hand fingernails. Lunular erythema was present in 34.7% cases in right hand fingernails and 37.5 cases in left hand fingernails. Onycholysis was present in 51.4% cases in right hand finger nails and 52.8% cases in left hand fingernails. Subungual hyperkeratosis was present in 48.6% cases in right hand fingernails and 40.3% cases in left hand fingernails. Salmon patch was present in 23.6% cases in right hand fingernails and 26.4% cases in left hand fingernails. Splinter haemorrhages was present in 13.9% cases in right hand fingernails and 18.1% cases in left hand fingernails. Pitting was the most common finding followed by onycholysis, nail plate crumbling and subungual hyperkeratosis.

Jeffrey J. Crowley, MD et al.<sup>21</sup> studied treatment options for nail psoriasis. They concluded that intralesional injection of triamcinolone acetonide 0.1-0.2 ml of 5-10mg/ml suspension into lateral nail folds. Nerve blockers or topical anaesthetics are given to prevent pain. In our study we had also given topical anaesthetic prior to intralesional triamcinolone acetonide to lessen pain.

David de Berker et al.<sup>22</sup> studied treatment of nail psoriasis. Intralesional injection of triamcinolone acetonide can be delivered into nail bed or nail matrix. It can be delivered via insulin syringe, fine gauze needle and syringe with Luer lock. Side effects included atrophy and pain at the injection site. In our study pain was the major inhibiting factor.

Stamatis Gregoriou et al.<sup>23</sup> studied treatment options for nail psoriasis. Triamcinolone acetonide 10mg/ml was used as the main intralesional agent in nail psoriasis. It was used bimonthly. In this study 70-90% of psoriatic patients with both nail bed and nail matrix lesions responded to intralesional steroids. However, onycholysis was more difficult to treat than remaining psoriatic lesions, with only

20-55% of patients responding. In our study we used monthly injections of triamcinolone acetonide and it was inferred that onycholysis was more difficult to treat.

In our study we found that Dexamethasone Iontophoresis is easy to administer, economical with no side effects and improvement was seen in nail psoriasis signs such as pitting, onycholysis, subungual hyperkeratosis and nail plate crumbling whereas Intralesional triamcinolone injection causes pain and atrophy of the nail matrix and nail bed and hence Dexamethasone Iontophoresis is a better alternative to Intralesional Triamcinolone acetonide.

## 6. Conclusion

Dexamethasone Iontophoresis is more efficacious than Intralesional Triamcinolone acetonide in nail psoriasis in same patient. Dexamethasone Iontophoresis is easy to administer, economical with no side effects whereas Intralesional Triamcinolone acetonide injection causes pain and atrophy of nail matrix and can cause damage to the nerve endings of the nail and hence Dexamethasone Iontophoresis is a better alternative to Intralesional Triamcinolone acetonide in nail psoriasis.

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