

# ROLES OF TOLAZOLINE HYDROCHLORIDE IN DEFORMITY PREVENTION AND CONTROL

B.S. Garg\*, J.S. Mathur\*\* and N.K. Tyagi\*\*\*

## ABSTRACT

*Management of primary and secondary deformities, in the field is a major difficulty faced by the peripheral health worker. This paper describes a simple method for the correction of deformities. 111 patients with clawing of fingers, 111 patients with neuritis and 54 cases with trophic ulcers were administered perineural injections of Tolazoline hydrochloride. The improvement in mobility in claw fingers ranged from 89.5 to 92.1 % Healing of ulcers and improvement in sensory loss is marked with Tolazoline injections. This method is found to be effective in the field conditions.*

## INTRODUCTION

WHO Expert Committee on Leprosy estimated that 25 percent of all leprosy patients suffer from some degree of physical deformity, The deformities continue in leprosy inspite of the use of antileprosy drugs<sup>1</sup>. WHO recommended the priority be given to the prevention of disabilities of leprosy by simple methods that can be applied in the field.

Most of the disabilities of leprosy arise out of anaesthesia secondary to the involvement of nerves (Cochrane<sup>2</sup>, Goheen<sup>3</sup>, Sexena & Mathur<sup>4</sup>). Nerve bundles on being rendered relatively ischaemic by oedema, trauma, reactions and other causes produce morphological lesions that resemble early stages of wallerian degeneration<sup>2</sup>. These changes are reversible, subject to the duration of ischemia and permanent damage to the nerve fibres.

## MATERIAL AND METHODS

111 patients with clawing, 111 patients with neural manifestations and 54 cases of trophic ulcers were administered perineural injections of Tolazoline hydrochloride by the technique of Saxena & Mathur<sup>4</sup> and Mathur<sup>5</sup>. The common sites of involvement of the peripheral nerves are shown in Fig. 1.

A clinical and laboratory diagnosis was made on all the patients. All the patients were treated under

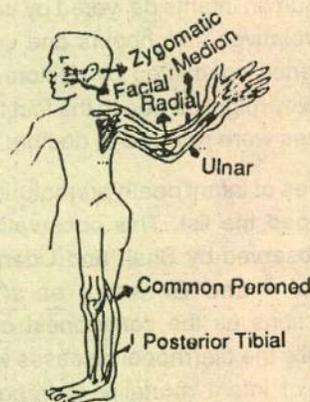


Fig. 1. Diagrammatic representation of the common site of nerve involvement in leprosy

identical conditions, and they pursued their work as before.

25 mg of Tolazoline hydrochloride was injected twice a week near the ulnar nerve in the ulnar groove, and around the lateral popliteal nerve in case of involvement of the foot at the neck of the fibula. All the patients were kept on the anti leprosy drugs, which they were receiving earlier. The patients were under observation for a period of 6-12 months.

In case of deformities of the hand, the type of deformity and the stage of clawing were recorded in each case.

The angle of deformity was measured at the metacarpo-phalangeal joint. In normal straight

\* Professor Department of Community  
Medicine, M.G.I.M.S.,  
Sevagram Wardha  
\*\* Professor and Head  
\*\*\* Professor in statistics

fingers were considered as 180° angle, which was measured with the help of a protractor having a movable arm. The difference of improvement in the angle and the movements before and after perineural Tolazoline hydrochloride were recorded in each case. Muscle power was also judged before and after Tolazoline hydrochloride by MRC scale.

For neural manifestations of loss of sensation of touch, pain and temperature, the subjective sensations were recorded as felt by the patient in comparison with normal skin sensation. Loss of sensation was recorded on the forearm, hand and digits according to the anatomical position, since the loss of sensation pertained neither to the nerve trunk nor to nerve foot distribution. The touch sensation was tested with the help of a cotton twig. Temperature was tested with the help of water kept in a test tube at 40 C and pain sensation was recorded with the help of a sterilised needle.

### OBSERVATION AND DISCUSSION

Leprosy has a predilection for peripheral nerve involvement. The majority of the cases in the present study had more than one nerve involvement like Job *et al*<sup>6</sup>. There were 87.7% patient with deformity in upper limb. Hasan also reported the same<sup>7</sup>. There

Table I  
Clawing of fingers - Before and after Tolazoline Hydrochloride

Stage of clawing	Before Tol. hydro		After Tol. Hydro	
	Improved		Not improved	
	No.	%	No.	%
1. Loss of flexion at Meta-carpo phalangeal joint.	38	92.1	3	7.9
2. Loss of extension at inter - phalangeal joint	54	94.4	3	5.6
3. Loss of extension at meta-carpo phalangeal joint	19	89.5	3	10.5
<b>Total</b>	<b>111</b>	<b>92.8</b>	<b>8</b>	<b>7.2</b>

The differences are not stastically significant at different joints.

where 83.8 % patients with clawing of hand before perineural Tolazoline hydrochloride injection. The improvement after Tolazoline hydrochloride was higher in first and second category (as may be seen from Table 1). However, the difference was not statistically significant. Ramu<sup>8</sup>, Sepaha & Sharma<sup>9</sup> have also successfully used the Tolazoline in the treatment of leprosy deformities.

When degree of clawing was measured the mean degree of improvement was significantly higher in little, index and middle finger (Table II). A patients could effectively use their hands for day to day work and perform the work at metacarpophalangeal and interphalangeal joints after treatment.

Table II  
Improvement in Degree of clawing after Tolazoline Hydrochloride at M.P. and IP joints

Finger of affected	No. of Sub	Mean	SD
Thumb	4	20	0
Index**	24	31.67	23.34
Middle+	30	33.67	20.93
Ring	41	33.54	24.25
Little**	57	43.68	25.38
<b>Total</b>	<b>156</b>		

+: P<0.05, \*\*: P<0.01

The improvement after Tolazoline was significant in muscle power of flexors of interphalangeal joint, extensors of interphalangeal joint and extensors of metacarpophalangeal joint. So was the improvement in flexors of wrists, extensors of thumb and opponens of thumb (Table III). Mathur<sup>5</sup> also reported the similar findings. The normal finger pinch is not possible to achieve even after reconstructive surgery (ICMR<sup>10</sup>). However, in the present study the patients were able to achieve even the pinch action.

In the present study only 51.9% patients had ulcers on lower limb. The improvement in the size and depth of ulcer was reasonably fair, however it was not found statistically significant. (Table IV & V). The ulcers in leprosy are resultant of anaesthesia, relative ischaemia, trauma and sepsis. The Tolazoline hydrochloride in the present study was used with the hypothesis that it will improve tissue permeability by

Table III  
Improvement in muscle power after Tolazoline Hydrochloride

Group of muscles	Before Tol. hydro		After Tol. Hydro			
			Improved		Not improved	
	No.	No.	%	No.	%	
1. Flexor of phalanges	59	55	93.2	4	6.8	
2. Extension of phalanges	58	54	93.1	4	6.9	
3. Flexor of metcarpo-phanangeal joint	23	21	91.3	2	8.7	
4. Extension of carpo-phanangeal joint	7	7	100.00	—	—	
5. Flexors of wrist	16	14	87.5	2	12.5	
6. Extensors of thumb	26	23	88.5	3	11.5	
7. Opponence of thumb	34	32	94.1	2	5.9	
<b>Total</b>	<b>223</b>	<b>206</b>	<b>92.4</b>	<b>17</b>	<b>7.6</b>	

Table IV  
Improvement in size of ulcer after Tolazoline hydrochloride

Treatment	Size of ulcer in mm		
	No. of sub.	Mean	SD
Before	54	10.61	4.68
After			
1) Reduced	14	9.86	2.82
2) Healed	40	10.88	5.16

The differences in size are not statistically significant

Table V  
Improvement in depth of ulcer after Tolazoline hydrochloride

Treatment	Depth of ulcer in mm		
	No. of sub.	Mean	SD
Before	54	3.69	1.66
After			
1) Reduced	14	4.36	1.46
2) Healed	40	3.45	1.67

improving blood supply and ischaemia of nerve which in turn shall correct the basic cause of ulcer-anaesthesia and relative ischaemia. Vaidyanathan also tried successfully vasodilators in trophic ulcers<sup>11</sup>.

WHO has recommended that in leprosy control priority should be given to the prevention of disabilities by simple methods which can be applied in the field<sup>1</sup>. The correction of leprosy deformities using Perineural tolazoline hydrochloride is an earnest step in the direction of evolving a simple and cheap for prevention and control of leprosy deformities.

### CONCLUSIONS

Most of the leprosy patients with deformities and released from control do not report to the hospital for surgical correction, while the present technique can be utilised in the field by paramedical staff after initial training.

Benefits derived from Tolazoline hydrochloride are :

1. Deformity correction : With this treatment limbs would be mobile and gain muscle power so that the individual can do day to day activities.
2. Sensatory improvement : It improves peripheral sensations, thereby it wards off the danger and prevents further damage to anesthetic hands.

### REFERENCES

1. WHO - A Guide on leprosy control WHO Geneva, 1980.
2. Cochrane R.G. and Davey T.F. In leprosy in theory and practice, John Wright Bristol (1964).
3. Goheen, R.H. - Sympathetic ganglionectomy for leprosy ulcer, Lep. In India. (1933) V(7), 4-5
4. Mathur J.S. and Saxena K.N. Intra-neural Tolazoline hydrochloride leprosy, J. Ind. Med. Ass (1964) 42, 3, 131-133.
5. Mathur J.S. 1965 leprosy deformities and priscol, X annual conference of ALPHA proceedings, page 114-117.
6. Job C.K., Selvapandian, A.J. and Kurian V.P. (1975).
7. Hassan, S. (1977) - A survey of leprosy deformities among the patients of Hyderabad city - Lepr. India 49:393.

8. Ramu, G., Intraneural priscol in paralysis due to Leprosy., Current Med. Practic., 1960, 4(8) , 383-85.
9. Sepha, G.G. and Sharma D.R. (1964) - Intraneural cortisone and priscol in treatment of leprosy, Lepr. In Ind., 36(4): 264-68
10. Vaidya Nathan, E.P. Trails of vasodillators on trophic ulcers, Lep. Rev 1961 32:144-49.
10. ICMR (1981) - Status report on leprosy, 33-36
11. Vaidya Nathan, Trials at Vasodillators on tropic vicers, Lep. Rev. 1961, 32; 144-49.

***Perturbations in the relation between the Technosphere and Sociosphere are a frequent cause of diseases & premature death***