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TROPIC ULCERATION OF THE FOOT TREATED WITH  
INTRA-ARTERIAL HYDERGINE

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Trophic ulceration of the foot is one of the commonest complications of leprosy, and one whose treatment presents many difficulties. The peripheral neural involvement causing loss of sensation, tactile and thermal, leads indirectly to ulceration especially of the feet due to (a) traumatization of the anesthetic area, usually over a bony prominence, and (b) an adjuvant deformity, e.g., a talipes varus, presenting an area to the sustained and continued pressure of weight-bearing. In these cases there is alteration of normal circulation to the extremity as a whole, the resulting avascularity being a contributory factor in the chronicity of the lesion.

MATERIAL AND METHOD

*Clinical material.*—There were 24 cases in this treatment series, and 10 controls who did not receive the experimental treatment. All were inpatients of the Trafalgar Home, the leprosarium for Singapore Island. The duration of ulceration ranged from 2 months to 5 years, except for 1 case in which the ulcer was of recent onset (14 days). One patient had ulcers on both feet.

Routine investigation on admission included microscopy of ear smears for the Hansen bacillus; the lepromin test; a complete blood count and hemoglobin determination; and an x-ray of the chest to exclude concomitant pulmonary tuberculosis. The location and size of the ulcer were charted on translucent washed x-ray film; and an x-ray picture of the foot was made to exclude the presence of associated sequestrae.

*Treatment.*—All patients were treated in total recumbency. General therapeutic measures included oral sulfone therapy (dapsons, DDS), 300-400 mgm. per week.

Hydergine was injected intra-arterially, 0.3 mgm. twice weekly into the femoral artery below Poupart's ligament. It is noteworthy that this procedure is surprisingly simple, and no untoward symptoms occurred.

Hydergine<sup>1</sup> consists of the following three hydrogenated ergot alkaloids: dihydroergocristine, dihydroergocornine, and dihydroergokryptine. This equi-mixture tends to promote peripheral vasodilatation by (a) a peripheral adrenergic action, (b) a direct dilator action—primary and manifest—on the smooth muscles of the vessel walls<sup>(6)</sup>, and (c) a central inhibitory action on the vasomotor center which leads to lowering of the vasomotor tone with a consequent diminution of arterial tension<sup>(1, 2)</sup>. The therapeutic value of these alkaloids in peripheral vascular disease has been assessed by Kappert and Hadorn<sup>(4)</sup> and by Popkin<sup>(5)</sup>.

<sup>1</sup>Hydergine is manufactured by the Sandoz Laboratories, Ltd. The form supplied for intramuscular use can also be used intravenously or intra-arterially.

## CLINICAL EVALUATION

Since 1 of the 24 cases in this treatment series had bilateral ulcerations, the number of ulcers treated was 25. The number in which the treatment was successful, with complete healing, was 9; another 5 showed decrease in size and clinical improvement; while 11 showed no improvement. Only 9 of the 24 cases were lepromin positive at the time of investigation, and it is interesting to note that of these 9 only 1 showed improvement with the Hydergine therapy. Only 1 case showed any complication directly referable to the intra-arterial injections, developing acute thrombophlebitis of the affected leg. This condition was easily controlled, but this was the only case in which treatment was suspended because of complications.

The 10 control cases, all with unilateral foot ulcers, were treated in the same way as the others, with dapsone therapy systematically and in total recumbency, but with normal saline dressings and no Hydergine injections. In these control cases the rate of healing of 6 ulcers was at least three times longer than those treated with Hydergine. The remaining 4 cases were extremely indolent, and their chronicity precluded spontaneous healing without surgical intervention.

These results were not as uniformly impressive as those of Gokhale in India<sup>(3)</sup>, who conducted a similar investigation. Our impression, however, is that Hydergine administered intra-arterially is an extremely useful adjuvant form of treatment, and has a definite place in our armamentarium. The first 6 cases in our series were subjected to thermocouple control, and the rise of temperature was noted at two-minute intervals after injection; the recording was taken from the toe clefts. An average rise of ten units (equivalent to 3 scale units per 1°F.) was seen, reaching a maximum in fifteen minutes.

The beneficial effect of Hydergine is due, it is believed, to the local vasodilatation produced. It is submitted that, combined with thermocouple control, cases may be selected for sympathectomy using Hydergine as a means of primary investigation. In the small, indolent ulcer without accompanying subjacent periostitis, Hydergine is of undoubted therapeutic value.

*Other forms of treatment for persistent ulcers.*—It is our policy with any chronic ulcer to insist that the patient be treated in total recumbency. After one week, using the usual local dressings, we incise the ulcer base and margins, together with fairly wide parallel colateral incisions if this is possible, thus undermining the skin on either side of the ulcer to effect complete closure by nylon suture. The resulting bare areas are grafted with a split skin graft. This is not always possible, especially on the sole of the foot. Here, if the ulcer is marginal, a counter incision is made arching concavely to the ulcer encroaching on the dorsum, thus producing a skin flap by means of which the ulcer can be sutured fol-

lowing excision. The "flap" is left attached at either extremity and is thus technically a "shift" of adjacent skin.

When an ulcer occurs on the heel, a large flap is fashioned by using a concave incision (inferiorly) extending approximately two inches above the heel, and so fashioning a flap by undercutting. The excised ulcer margins can then be sutured. Any underlying bone pathology is dealt with as a primary measure. All these patients are given antibiotics for a minimum period of two to three weeks.

Having effected complete healing of the ulcer area, it is considered imperative to correct any associated orthopedic deformity by tendon transplant, e.g., tibialis posticus transplant (interosseous or periosseous); or, secondly, some form of foot fusion, usually a pantaloid arthrodesis performed for foot drop.

#### SUMMARY AND CONCLUSION

Of 25 foot ulcers in 24 cases of leprosy treated with intra-arterial Hydergine, 9 ulcers showed complete healing, 5 showed reduction in size and an increase of granulation tissue, while 11 showed no improvement.

Other surgical procedures are described for the treatment of chronic foot ulceration.

#### RESUMEN Y CONCLUSIONES

De 25 úlceras del pie en 24 casos de lepra, tratadas con Hydergine por vía intraarterial, 9 revelaron cicatrización total y 5 reducción del tamaño y aumento del tejido de granulación, mientras que 11 no mostraron mejoría.

Se describen otros procedimientos quirúrgicos para el tratamiento de la ulceración crónica del pie.

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