

THERAPY

A PRELIMINARY REPORT ON ULTRASONIC THERAPY ON CERTAIN SKIN CONDITIONS

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Various physical therapeutic agents like X-ray, ultraviolet rays, solid carbondioxide and surgical diathermy, have been used in certain skin conditions since long time. Ultrasonic waves were employed therapeutically for the first time before the second world war by Denier (1936) and Pahlman (1938) for various medical conditions. Aldes (1959) tried ultrasonic waves in the treatment of epicondylitis. Later Mune and Kield (1963) published similar report in 16 patients with good results. But no literature is available on its use in skin conditions.

At present, the ultrasonic rays are being used for a variety of conditions like osteo-arthritis, bursistis, sprain, myalgia and tendinitis. An attempt has been made here to find out the therapeutic effect of the same in certain skin conditions.

The sound waves with higher frequencies which cannot be detected by the human ears are called the ultrasonic waves. The frequencies used in medical conditions vary between 0.8 to 1.0 mega cycles per second.

The ultrasonic energy is derived from mechanical vibrations developed in certain crystals when their opposite sides are subjected to alternating electrical field, the so called peizo-electric effect.

The biological effects of ultrasonic waves when passed through the tissues are as follows:- (1) Thermal effect—when the waves are absorbed by body tissues heat is produced. The greatest heat is at the skin and the superficial tissues but considerable deep heating also takes place. The result is increased vasodilatation and increased metabolism. (2) Mechanical effect—the waves cause to and fro movement of the particles and although the actual distance moved by each particle is small, the variations in pressure are considerable leading to mechanical agitation of the tissue or micromassage of the cells. The permeability of membranes is increased, adherent tissues are loosened probably due to separation of collagen fibres from each other along with softening of the cement substance. If the movement is excessive then there is distruction of the cells leading to death of the tissue. (3) Analgesia—the relief in pain is obtained possibly due to direct effect of the sound waves on the nerve endings, although this may be in part due to the thermal effect itself. (4) Chemical effect—it has been shown in the laboratory that ultrasonic energy can accelerate chemical changes but there is no evidence of increased reaction in the tissues beyond those which otherwise result from rise in temperature.

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Received for publication on 26-4-1969.

MATERIAL & METHODS

Following types of patients were selected for this treatment.

TABLE I

Showing the types of lesions treated by ultrasonic therapy.

S. N.	Type of lesion	Diagnosis	No. of cases
1.	Lichenified.	Neurodermatitis	8
2.	Parakeratotic.	Psoriasis	3
3.	Viral	Warts	2
4.	Hyperkeratotic.	Keratosis of palms	2
5.	Diskeratotic.	Darier's disease.	1

The dosage schedule followed was as given below :—

Initial dosage given in all types of cases was 1.0 W/cm² except in hyperkeratotic lesions where it was started with 1.5W cm². The treatment was given for 4 to 6 minutes at each sitting and close observation was made of the effect produced by it in individual cases. Later on the dosage was increased and maintained between 1.2W/cm² and 2.0W/cm² for 6 minutes depending upon the response and the thickness of the lesion. Longer the duration of the disease and thicker the lesion, high dosage for longer periods was required as in hyperkeratosis. Total number of exposures given was between 8 to 20. In case where more than 12 sittings were required treatment was discontinued in between for a period.

OBSERVATIONS

Group I Neurodermatitis the results were evaluated as follows:—

1. Excellent:— When there was complete relief in itching followed by complete subsidence of the lesion,
2. Very good:— When there was complete relief in itching and moderate subsidence of the lesion.
3. Good:— When there was moderate relief in both itching and lichenification.
4. Poor:— When little or no response was observed.

TABLE II

Shows the result of the treatment with ultrasonic in neurodermatitis.

S. N.	Results	No. of cases
1.	Excellent.	4
2.	Very Good.	3
3.	Good.	1
4.	Poor	Nil.

The above patients of neurodermatitis were followed up for varying periods from 4 months to 6 months. Two cases from Group II showed recurrence.

Group II - Psoriasis - Three cases were treated but only two of them followed. Incidentally increased exfoliation and thinning of the plaques along with relief in itching were observed in both. It may be noted here that the treatment given was only at one selected site but a general response was observed.

The psoriatic patients are at present in a state of remission after the treatment with ultrasonic which was completed 5 months back.

Group III - Warts - Excellent result was obtained in two cases who got the ultrasonic treatment. Reduction in size of the wart was followed by complete disappearance of the lesion.

Both the patients had no recurrence 4 months after treatment. In the same recurrence was noted within 2 months of treatment with cautery.

Group IV - Keratosis of the palm - In two cases treated with ultrasonic rays nearly complete thinning of the skin was noted. It was followed by gradual and complete disappearance of the lesion and its return to normalcy.

Some trace of hyperkeratosis was seen on the palm 4 months after treating the patients.

Group V - Dyskeratosis - Only one case was treated. Although subjective relief was obtained no objective relief was noted. In this case also treatment was given at one selected site.

DISCUSSION

It was observed in this series that ultrasonic helped in two ways in relieving the symptoms in skin conditions, firstly by relieving the itching and secondly by gradual diminution of the lesion.

The relief in itching noticed was markedly in neurodermatitis, psoriasis and Darier's disease. It is difficult to explain the exact mode of action but it may probably be due to direct action of the rays on the nerve endings, which it makes numb or destroys completely. Perhaps the heating effect obtained might also be contributory. It was further observed that subjective relief in itching was much better than local applications of hydrocortisone ointment.

Similarly thinning and flattening of the lesion may be due to many factors and possibilities may be considered. It is well known that the ultrasonic has got effect on growing collagen matrix particularly the newly formed ones. It may inhibit its growth, may disintegrate the fibres and ultimately destroy it. This is the way relief is obtained in cases of scars and contractures. This might be one of the possibilities of its effects in skin conditions. Moreover as the vicious circle of itching and scratching is broken in neurodermatitis this might be helpful in healing of the lesion and consequently its thinning out.

The mechanical agitation of the tissue cells i. e. micromassage as it is called might be leading to increased exfoliation and consequently flattening of the plaques.

Another known effect of the ultrasonic is destruction of the cells. The proteins thus liberated from the cells in the process might be resulting in development of auto-immunity which might be helping in the same way as the injection of milk or autohemotherapy.

The relief obtained in cases of warts could also be explained on the same basis as above i. e. disintegration of the collagenous tissues and death of the cells.

It is difficult to prove or disprove the action of ultrasonic on virus directly. Psychotherapeutic effect cannot be ruled out.

SUMMARY

The effect of ultrasonic is reported in 16 cases suffering from various skin conditions. Possible mechanism of the relief of signs and symptoms is discussed.

ACKNOWLEDGEMENT

We are thankful to the Dean, Goa Medical College, for permitting us to report these cases.

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