Summary and Conclusion

The aim of our study was to explore the therapeutic effect and the mechanism of acupuncture for reduction of body weight.

The present study included sixty patients with simple obesity attending the outpatient clinic of the Rheumatology and Rehabilitation Department, Benha University Hospitals. Their ages ranged between 17 to 51 years with a mean of 30.4 ± 7.02 years.

Exclusion criteria included, patients already participating in any other weight loss regimen, pregnancy, lactation, patients taking contraceptive pills, patients taking antidepressant, hypertensive patients, diabetic patients and patient taking steroids

Primary assessment measures

The patients were primarily assessed with the following measures:

a- Weight in kg and height in cm.

b- Body mss index (BMI) = $\frac{weight\,(kg)}{Square\ of\ \ height\ \left(m^2\right)}$

c- Systolic and diastolic blood pressure.

d- Circumferences (right arm, right thigh, chest, abdominal, hip and waist to hip ratio).

e- Skin fold thickness (right biceps, right triceps, right subscapular, and right suprailiac).

f- Laboratory investigation (urine, CBC, lipid profile [including triglycrides, total, high density and low density cholesterol] and serum serotonin level).

Our patient were classified randomly into three groups:

Group I: comprised twenty patients and after primary assessment measures, group I patients were enrolled in low caloric diet, and physical training exercise program.

Group II: comprised twenty patients and after primary assessment measures, group II patients were enrolled in low caloric diet, physical training exercise program and auricular acupuncture.

Group III: comprised twenty patients and after primary assessment measures, group III patients were enrolled in low caloric diet, physical training exercise program and combined auricular and meridian acupuncture.

Acupuncture sessions were done twice weekly for twelve weeks.

Low caloric diet (LCD) was 10 to 20 kcal/kg.

Exercise program: walking, upper extremities exercise.

Auricular acupuncture points selected were: (Shen Men, San Chiao, stomach and hunger points).

Meridian acupuncture points selected were: (Tisanshu [ST25], Huaroumen [ST 24], Wailing [ST 26], Xiawan [Ran 10], Shimen [Ren 5], Quchi [LI 11] and Zusanli [ST 36]).

After completion of the twelve weeks program, patients were re-assed using the same measures used in the primary assessment.

The findings of this study were as follow:

As regard weights in (kg), the mean values before treatment were 94.12 ± 8.85, 93.3 ± 9.83 and 95.1 ± 2.48 which became 89.13 ± 11.13, 85.3 ± 9.13 and 82.5 ± 8.35 after treatment with a percentage of change

5.31%, 8.71% and 15.23% respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

As regard Body Mass Indices (BMI) of the studied groups, the mean values before treatment were 36.7 ± 3.15, 35.5 ± 4.12 and 36.8 ± 5.12 which became 34.63 ± 3.59 , 32.51 ± 6.17 and 31.51 ± 6.14 after treatment with a percentage of reduction in BMI 5.62%, 8.42% and 14.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

As regard systolic blood pressure (SBP) in mmHg of the studied groups, the mean value before treatment were 126.1 ± 10.95, 128.2 ± 13.59 and 129.3 ± 19.67 which became 123.15 ± 6.71, 121.71 ± 8.91 and 120.31 ± 10.12 after treatment with a percentage of reduction in (SBP) 2.31%, 5.61% and 6.92% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

As regard diastolic blood pressure (DBP) in mmHg of the studied groups, the mean values before treatment were 83.12 ± 10.12, 84.12 ± 9.71 and 85.71 ± 10.71 which became 81.71 ± 7.85, 80.91 ± 8.75 and 78.71 ± 9.31 after treatment with a percentage of reduction in DBP 2.49%, 4.76%, 8.31%in groups I, II and III respectively. No significant

difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

As regard changes in different body circumferences of the studies groups, we noted the following results:

The mean values of right arm circumferences (Rtac) in cm of the studied groups were 36.71 ± 2.42 35.91 ± 3.14 and 35.61 ± 5.12 which became 34.12 ± 2.12, 33.07± 2.19 and 32.71 ± 3.09 after treatment with a percentage of changes in 5.51%, 6.1% and 8.52% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

The mean values of right thigh circumferences (Rttc) of the studied groups were 70.49 ± 4.88, 69.51±5.12 and 72.03 ± 5.03 which became 66.12 ± 5.12, 65.31 ± 54.71 and 63.91 ± 5.32 after treatment with percentage of changes 5.71%, 6.03% and 12.51% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

The mean values of Chest circumferences (Chc) in cm of the studied groups before treatment were 114.12 ± 4.18, 114.71 ± 5.09 and 115.61 ± 4.81 which became 112.5 ± 5.13, 111.3 ± 6.12 and 110.5 ± 4.12 after treatment with a percentage of change 1.79%, 2.63% and 4.56% in

groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a significant difference ($p < 0.05$) was found in improvement.

The mean values of abdominal circumferences (Abc) in cm of the studied groups before treatment were 110.69 ± 3.4, 109.13 ± 4.71 and 110.01 ± 5.3 which became 105.1 ± 3.71, 104.52 ± 5.18 and 102.07 ± 5.19 after treatment with a percentage of changes in (Abc) 4.51%, 6.12% and 7.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

The mean values of hip circumference (Hc) in cm of the studied groups before treatment were 123.4 ± 5.27. 124.11 ± 5.38 and 123.3 ± 6.71 which became 117.51 ± 4.75, 116.71 ± 5.47 and 114.01 ± 6.71 after treatment with a percentage of changes in (Hc) 4.1%, 6.21% and 7.52% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and a highly significant difference ($p < 0.001$) was found in improvement.

The mean value of waist to hip ratio (WHR) of the studied groups before treatment were 0.89 ± 0031, 0.88 ± 0.0037 and 0.89 ± 0.0028 and became 0.88 ± 0.002, 0.87 ± 0.0031 and 0.87 ± 0.002 after treatment with a percentage of changes 1.21%, 1.31%, 2.44% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

As regard changes in the skin fold thickness of the study group, we found the following:

The mean values of biceps skin fold thickness in (cm) before treatment were 2.5 ± 0.71, 2.53 ± 0.81 and 2.61 ± 0.91 which became 2.31 ± 0.91, 2.26 ± 0.82 and 2.21 ± 0.71 after treatment with a percentage of changes 8.91%, 12.31% and 15.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

The mean values triceps skin fold thickness in (cm) before treatment were 3.41± 0.85, 3.5 ± 0.92 and 3.6 ± 0.81 which became 3.27 ± 0.72, 3.15 ± 0.67 and 3.12 ± .73 after treatment with a percentage of changes 8.21%, 11.7% and 13.51% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

The mean values of subscapular skin fold thickness in (cm) before treatment were 4.25 ± 0.81, 4.2 ± 0.71, 4.4 ± 0.81 which became 3.92 ± 0.71, 3.72 ± 0.81, 3.52 ± 0.71 after treatment with a percentage of changes 7.12%, 11.93% and 19.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and highly significant difference ($p < 0.001$) was found in improvement.

The mean values of suprailiac skin fold thickness in (cm) before treatment were 4.42 ± 61, 4.62 ± 0.52 and 4.82 ± 0.61 which became 4.23

± 71, 4.25 ± 0.92 and 4.12 ± 0.84 after treatment with a percentage of changes 4.51%, 8.6% and 14.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

As regard the changes in different parameters of lipid profile in the studied groups, we found the following:

The mean values of triglycride (TG) level in (mg/dl) before treatment were 111.75 ± 19.85, 112.76 ± 20.12 and 113.56 ± 21.71 which became 105.1 ± 16.76, 100.71 ± 20.12 and 99.7 ± 15.12 after treatment with a percentage of changes 5.41%, 10.31% and 12.81% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and highly significant difference ($p < 0.001$) was found in improvement.

The mean values of total cholesterol (TC) level in (mg/dl) before treatment were 141.71 ± 3.012, 143.21 ± 29.17 and 144.32 ± 4.12 which became 128.12 ± 35.12, 125.12 ± 91.12 and 123.12 ± 51.21 after treatment with a percent of changes 9.21%, 12.35% and 14.59% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a significant difference ($p < 0.05$) was found between them after treatment and highly significant difference ($p < 0.001$) was found in improvement.

The mean values of high density liproprofien (HDL) cholesterol in (mg/dl) before treatment were 31.95 ± 6.19, 33.12 ± 7.12 and 34.12 ± 8.71 which became 40.12 ± 6.12, 42.71 ± 5.15 and 43.12 ± 5.12 after

treatment with a percentage of changes 20.1%, 23.1%, 26.41% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.01$) was found in improvement.

The mean values of low density lipoprotien (LDL) cholesterol level in (mg/dl) before were 115.51 ± 18.15, 117.12 ± 19.12 and 118.30 ± 20.32 which became 103.51 ± 20.12, 101.12 ± 16.71 and 100.21 ± 15.71 after treatment with a percentage of change 6.93%, 9.32%, 18.31% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before and after treatment, but a highly significant difference ($p < 0.001$) was found in improvement.

As regard serotonin level in ug/ml of the studied groups, the mean values before treatment were 222.5 ± 16.78, 219.31 ± 20.17, and 220.19 ± 18.19 which became 225.12 ± 20.17, 270.7 ± 20.17 and 284.7 ± 15.71 after treatment with a percentage of changes 1.3%, 23.28% and 29.09% in groups I, II and III respectively. No significant difference ($p > 0.05$) was found between all groups before treatment, but a highly significant differences ($p < 0.01$) were found between them after treatment and in improvement ($p < 0.001$).

In our study, many of variables were significantly improved with acupuncture treatment of obese patients so multiple regression analysis was done to determine the best improved variables. Among the wide range of variables considered in the present study, serum serotonin levels, high density lipoprotein (HDL) cholesterol, weight, and biceps skin fold thickness respectively were the most improved variables in acupuncture treatment of obese patients.

Conclusion:

- This study supports the role of acupuncture (either auricular or meridian) in the management of obesity.

- In both regimens, we have found improvement in weight, BMI, systolic and diastolic blood pressure, body circumferences, skin fold thickness, lipid profile and serum serotonin level.

- Compared with auricular group, combined auricular and meridian group led to significantly more improvement results.

- Among the wide range of variables: serum serotonin levels, HDL, weight and biceps skin fold thickness were the most improved variables.

- Acupuncture is a simple, cheap, effective and available treatment for obese patients.