Original Articles

Physique of patients with carcinoma of the female genital tract

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Summary

The authors carried out an investigation with a detailed anthropometric programme on 135 women suffering from different kinds of cancer: ovarian n = 35, endometrial n = 22, cervical n = 54, and vulvar/vagina n = 24. All patients were Hungarian and belonged to European ethnic groups. Their age varied between 25.6 and 85.0 years. Somatotype of the patients was estimated with the Heath-Carter anthropometric somatotyping method.

Somatotype (endomorphy, mesomorphy, ectomorphy) of the patients with ovarian cancer was respectively: 6.8-5.3-1.0, patients with endometrial cancer 7.9-5.8-0.9, patients with cervical cancer 6.8-5.3-1.3, and patients with vulvar cancer 7.5-5.9-0.9. Based on variance analysis, there was no significant difference among subgroups at the $p < 0.05$ level. The patients in all four groups – in the overwhelming majority of cases – showed mesomorphic-endomorph forms, i.e., endomorphic elements dominated in their physique and mesomorphy (robusticity) was greater than ectomorphy (linearity).

Key words: Female patients; Carcinoma (ovarian, endometrial, cervical, vulvar/vaginal); Body measurements; Somatotype; Obesity.

Introduction

Observations and later investigations of human body build are equal in age to mankind. We have an exact description of the human body from ancient times, however, scientific surveys on human physique were done in the 19th and 20th centuries. For physique we understand the morphological constitution of the adult, which is formed by manifestation of genetic endowment and as a result of adaptation to environmental effects [1]. Human biology usually investigates the outer form of the body, with several methods or with combination of these methods, namely somatometry [2, 3], somatoscopy [4], somatotyping [5-8], and multivariate analysis, e.g., the SPSS package, a computer-oriented technique.

Nutritional status and cancer risk has also been of long interest. Most studies have demonstrated a strong association between obesity and cancer, particularly but not exclusively between obesity and the "supposed" hormone-dependent cancers such as endometrial carcinoma. To study fat distribution and cancer risk, several indices have been developed without conclusive association. In contrast, most cancer patients have deficits in protein, fat and glucose metabolism, perhaps due to inefficient metabolic pathways [9]. Weight loss is common in gynaecological cancer patients, with a loss of more than 5% in a substantial proportion, and has been associated with advanced stages [10]. These authors using a nutritional grading system found that 60% of their patients with gynaecological cancers including ovarian, endometrial, cervical, vaginal and vulvar carcinoma had a significant nutritional risk. The average weight loss was less striking in endometrial and vulvar cancer.

The optimal method of nutritional assessment has yet to determined. Methods include clinical and research tools, the latter, which may be more accurate, are not available to most clinicians. Anthropometric measurements are inexpensive and easy to perform. Stature, body mass, triceps skinfold thickness and mid-arm muscle circumference are the most commonly used; their accuracy, however, depends on the experience of the examiner and whether population-matched controls are available. In any case, anthropometric data are still widely used.

Relationships between stature and cancer incidence have been less commonly examined. Some studies found an association with increased body height [11]. Recently, Albanes *et al.* [11] reported a positive association of adult stature and otalgic cancer incidence. Taller individuals developed cancer at a substantially higher rate then individuals in the lower quartile. This effect was of greater magnitude in men and apparently independent from other prognostic factors. Other anthropometric parameters have rarely been investigated in relation to cancer incidence.

The aim of our study was to find out if there is any demonstable difference with anthropometric data in physique among patients with ovarian, endometrial, cervical, and vulvar carcinoma, and if it has any clinical significance. To our knowledge, this is one of the first reports on detailed anthropometric measurements and the first paper about somatotypes in gynaecological cancer patients.

Revised manuscript accepted for publication June 9, 2004

Material and Methods

The authors organised and carried out a study with a detailed anthropometric programme (22 body measurements) on 135 women suffering from different kinds of cancer. These patients were treated in Budapest at the Saint Stephen Hospital. The investigations were undertaken in the 1990s. All patients were born in Hungary, were Hungarian and belonged to European ethnic groups. Age varied between 25.6 and 85.0 years (mean = 59.71 years).

According to the types of the cancer, the patients formed four subsamples as follows:

Ovarian (Group I), Endometrial (Group II), Cervical (Group III), and Vulvar/vaginal (Group IV). The ovarian (I), the endometrial (II), and the vulvar/vaginal (IV) groups were on average older (range 36-85, mean 60.5-67.3 years) and the youngest was the cervical (III) group with a mean age of 53.4 years. The young adult age group comprised only cervical cancer patients, about one-third of the patients were in the mature age group, and more than half of the sample were over 55 years of age. About one-sixth of the sample was over 75 years of age (Table 1).

Table 1. — *Age distribution of the female cancer patients investigated.*

Age*	Group I ovarian n = 35	Group II endometrial n = 22	Group III cervical n = 54	Group IV vulvar/vaginal n = 24	Together n = 135
Adults (21-35 ys.)	–	–	6	–	6
Maturus (35-55 ys.)	9	7	21	3	40
Old age (56-74 ys.)	18	13	21	15	67
Senescence (75 ys.)	8	2	6	6	22
Mean age (yrs.)	63.70	60.53	53.43	67.25	59.71
Age range (yrs.)	41.9-81.2	40.7-80.1	25.6-82.7	35.9-85.0	25.6-85.0

*According to the generally used classification in biological anthropology.

Distribution according to profession of the patients: It is interesting that intellectual (white-collar) people were only in groups I, II, and III. Manual workers and family members made up the majority of all groups. It was only natural in our sample (recruited from the capital and urban areas) that agricultural labourers were few in number. Cleaning women appeared in all groups, and it is interesting that in Group IV (vulvar/vaginal) there were four hairdressers (Table 2).

Table 2. — *Profession of the female cancer patients.*

Profession	Group I ovarian	Group II endometrial	Group III cervical	Group IV vulvar/vaginal	Together
Intellectual	4	2	3	–	9
Non-manual	7	4	19	4	34
Manual worker	10	11	25	10	56
Agricultural labourer	2	3	–	1	6
Family member	10	2	4	6	22
Unknown	2	–	3	3	8
Sum total	35	22	54	24	135

The following body measurements were taken: body mass, sitting height, stature, height of acromion, height of dactylion (the length of the upper extremity was calculated from these two measurements), height of anterior superior iliac spine (= length of the lower extremity), biacromial diameter, bi-iliocristal diameter, chest circumference, upper arm circumference, forearm circumference, thigh circumference, calf circumference, bicondylar humerus width, bicondylar femur width, and seven skinfold thicknesses: over biceps, over triceps, subscapular, supra-iliac, abdomen (umbilicus), thigh and medial calf.

Anthropometric measurements were always taken in the morning hours. The patients were minimal clothing and were barefoot. The senior author of this paper, a well-trained expert in anthropometry, always took the measurements. Internationally standardised measuring tools were used and Martin's anthropometric technique was followed taking into consideration also recommendations of the International Biological Programme, Section on Human Adaptability [12].

For elaboration of the data, regular mathematical-statistical techniques were used (SPSS programme package). To estimate somatotype, the Heath-Carter anthropometric somatotyping method [8] was applied. The original seven-unit score created by Sheldon [5] was enlarged by Heath [6, 7], elaborating the anthropometric approach of the physique with somatotyping [8].

The somatotype is a convenient shorthand descriptor of overall physique in terms of body shape and composition, independent of body size. It combines an appraisal of the components, endomorphy or relative adiposity, mesomorphy or musculoskeletal robustness and ectomorphy or linearity into a three-number rating. Because of its uniqueness, somatotyping has been used to study many aspects of exercise, sport sciences, clinical practice, and human biology [8].

The three-numerical rating represents the human body as a whole by giving relative component dominance. In somatotyping, when the values differ more than half a unit from each other "differences" among component values of (sub) groups are used as qualifiers. Visualization of somatotypes occurs on a somatochart, which is a schematic triangular-shaped, two-dimensional representation of the range of known somatotypes. Individual somatotypes can be plotted as points (somatopoints) and group dispersions can be examined [8]. There are two groups of tests for analysis of somatotypes as a whole: [1] a test for the differences between somatotype means and [2] a test for the scatter of somatotypes about their means (for the appropriate equations (see Carter & Heath) [8].

In a further analysis, the somatotype dispersion distance (SDD), which is a vector having both magnitude and direction, can be evaluated and where appropriate the displacement between two somatoplots can be given by magnitude and polar coordinates when the somatochart is oriented with the mesomorphy axis to the North. The SDD is used for distances on the two-dimensional somatochart, however, a point in three-dimensional space, called a somatopoint, best represents somatotypes. The distance between any two somatopoints is the somatotype attitudinal distance (SAD), calculated from the component units [8].

Parametric statistics make easy comparisons among groups. Comparing the four groups, an analysis of variance was carried out. The ANOVA for somatotype data follows the methods used for descriptive statistics, a model for one-way ANOVA. The analysis offers first, a possibility to compare means of the distance of individual somatotypes (somatopoints) from the mean somatotype of their own group and second, a possibility to compare mean distances of somatopoints from the mean of the cumulated somatodata of the four groups.

Results

The usual parameters of the body measurements (including age and somatotype) of the whole sample are presented in Table 3. Mean stature is mean = 156.24 cm which is smaller/shorter than the Hungarian average (which can be estimated today about 165 cm [13]. Table 4 shows the body measurements according to subgroups. There are no remarkable differences in stature among the subsamples. The (oldest) vulvar/vaginal group (IV) was the shortest (mean = 155.0 cm), and the endometrial group (II) the tallest (mean = 157.5 cm).

Table 3.— *Age, body measurements and somatotype of all female cancer patients investigated (n = 135).*

Characteristics	Mean	SD	SE	Vmin	Vmax	W
Age (years)	59.71	13.59	1.17	25.57	85.04	59.47
Body mass (kg)	67.43	14.95	1.29	25.3	103.8	78.5
Sitting height (cm)	82.76	3.56	0.31	73.2	92.4	19.2
Height (cm)	156.24	6.02	0.52	141.6	169.8	28.2
Length of upper extremity (cm)	68.90	3.52	0.30	59.4	76.5	17.1
Length of lower extremity (cm)	85.86	5.19	0.53	76.0	96.6	20.6
Biacromial width (cm)	36.28	1.76	0.15	31.8	40.8	9.0
Bi-iliocristal width (cm)	30.19	2.23	0.19	25.3	35.5	10.2
Chest circumference (cm)	91.53	10.19	0.88	79.8	116.1	36.3
Upper arm circumference (cm)	27.54	4.69	0.40	18.1	42.8	24.7
Forearm circumference (cm)	23.40	2.71	0.23	13.4	30.3	16.9
Thigh circumference (cm)	54.97	7.27	0.63	29.0	77.4	48.4
Calf circumference (cm)	34.57	4.98	0.43	20.2	59.0	38.8
Bicondylar humerus (mm)	66.53	6.00	0.52	52	97	45
Bicondylar femur (mm)	97.36	9.20	0.79	78	132	54
Skinfold, biceps (mm)	17.95	7.99	0.69	2	46	44
Skinfold, triceps (mm)	24.07	9.11	0.78	3	50	47
Skinfold, subscapula (mm)	26.17	11.01	0.95	2	54	52
Skinfold, suprailiac (mm)	27.36	11.18	0.96	3	54	51
Skinfold, umbilicus (mm)	31.95	10.96	0.94	4	60	56
Skinfold, thigh (mm)	36.63	12.50	1.08	7	61	54
Skinfold, medial calf (mm)	24.22	8.52	0.73	4	55	51
Endomorphy	**7.13**	2.06	0.18	0.5	11.0	10.5
Mesomorphy	**5.48**	1.99	0.17	2.5	13.5	11.0
Ectomorphy	**1.08**	0.95	0.08	0.5	5.0	4.5

Connecting stature, the following had to be taken into consideration:

1) The majority of women examined were in "old-age" age (over 55 years).

2) Secular growth changes prevailed in Hungary by the third quarter of the 20th century, i.e., the stature of our sample can be compared to an earlier estimated Hungarian average of 18-year-old girls: 159-162 cm [14]. In this sense, the stature of our elderly sample is moderately smaller but acceptable knowing about the secular trend.

Calculating the stature of the patients older than 50 years of age, their mean height was 155.86 cm compared to that of our whole sample, 156.24 cm; this difference is 4 mm and is negligible.

For body mass, the endometrial (II) group was the heaviest with a mean = 73.8 kg (47.0-98.8 kg), and the ovarian (I) group was the lightest, mean = 65.7 kg (46.3-98.0 kg).

In breadth measurements of the trunk there were minimal differences among the groups. The endometrial (II) group had the widest shoulders and pelvis, i.e., the widest trunk and a robust torso, with the narrowest belonging to the ovarian (I) group. The endometrial (II) group was the largest also in girth measurements, the upper arm, thigh and calf circumferences. They were the most robust also according to the bicondylar humerus and femur width. Their subcutaneous fat (skin/fat-fold) was the greatest. On the other hand, the ovarian group (I) was the least robust and had the lowest body fat.

The ovarian (I) and cervical (III) groups were reduced to one unit, and the endometrial (II) and the vulvar/vaginal (IV) groups to one unit, based on the body measurements. Percent of "grouped" cases correctly classified in the above-mentioned first unit was 69.05% and in the second 70.10%, i.e., discriminant analysis did not show any significant differences. It seems that distribution of the elements of the whole sample showed a "normal-like" form, i.e., near to a homogeneous distribution. This is true also for grouping according to age of the patients.

Somatotype: Mean somatotype (endomorphy, mesomorphy, ectomorphy) was 7.13-5.48-1.08, i.e., endomorphy was dominant and the second component, mesomorphy, was greater than the third one, ectomorphy.

The ovarian (I) group showed a definitive meso-endomorph picture with a mean somatotype of 6.80-5.26-1.00, respectively (Figure 1, Table 4). The endometrial (II) group distribution on the somatochart was similar with a mean somatotype of 7.93-5.82-0.91, respectively (Figure 2, Table 4). This group, compared to the others, was the most endomorphic and a little more mesomorphic, i.e., relatively more robust. The cervical (III) group showed a somewhat different picture. The majority of the women were meso-endomorph (as the whole sample), however one or two patients were distributed in almost all fields of the somatochart. This was asserted also in mean somatotype: 6.83-5.31-1.26, respectively (Figure 3, Table 4). The body build of this large subgroup was similar to the ovarian (I) group but a little more linear. The vulvar/vaginal (IV) group was remarkably endomorphic and the most mesomorphic, with a mean somatotype of 7.54-5.88-0.94, respectively (Figure 4, Table 4). This group was very similar to the endometrial (II) group.

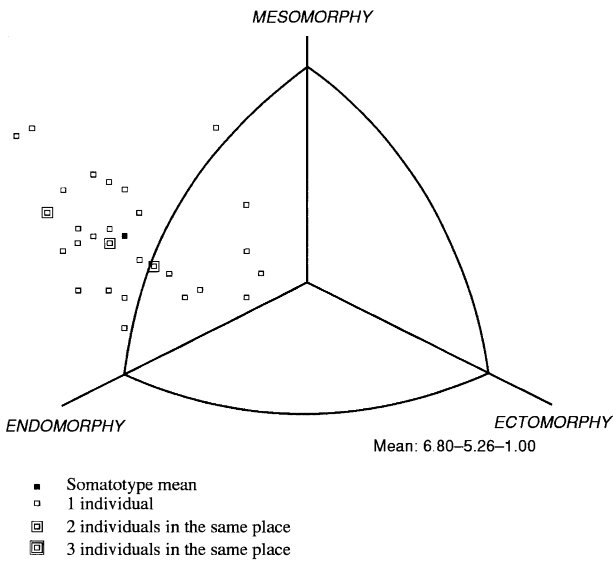

Figure 1. — Somatotype of patients with ovarian cancer (Group I)

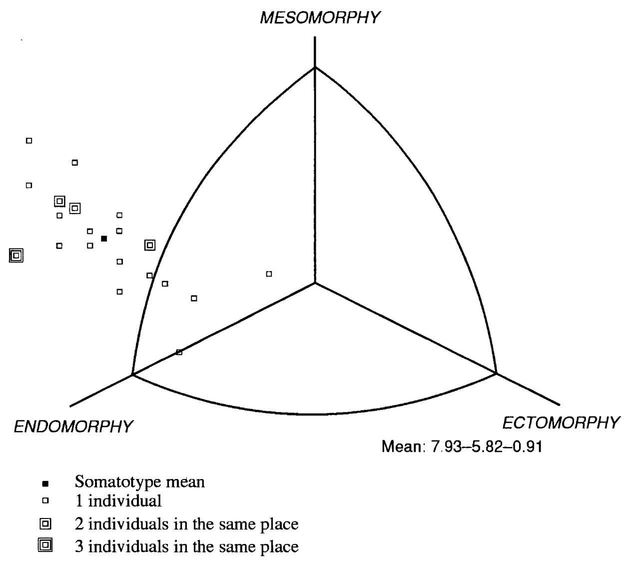

Figure 2. — Somatotype of patients with endometrial cancer (Group II).

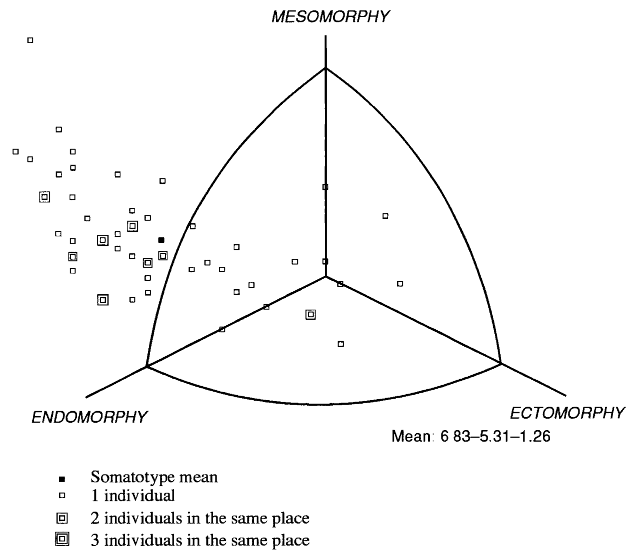

Figure 3. — Somatotype of patients with cervical cancer (Group III).

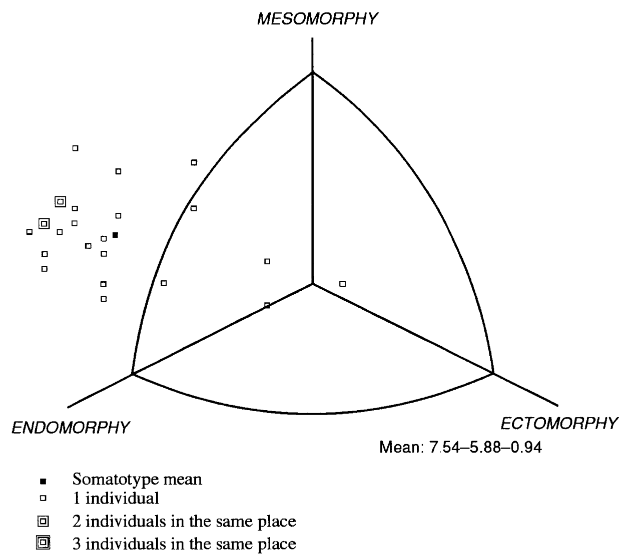

Figure 4. — Somatotype of patients with vulva/vaginal cancer (Group IV).

It can be said that on one hand the ovarian (I) and cervical (III) groups were similar in relatively high values of endomorphy and on the other hand, the endometrial (II) and vulvar/vaginal (IV) groups had relatively low values in this component.

As shown in Figure 5, the somatoplots of the mean somatotype of all four groups was situated outside the somatochart "arch", thus resulting as mesomorphic-endomorph.

ANOVA gave the following results for the SAD: $F[_{3;\,135}] = 3.2507$, and this value was significant ($p < 0.05$). The correspondence value of the SDD was 2.4767, which was not significant. It can be said generally that there were no significant differences among the groups at the $p < 0.05$ level, i.e., no two groups were significantly different at the mentioned level.

Discussion

A review of the literature showed that approximately 25% of endometrial cancer is causally related to obesity [15]. The association is disproportional for overweight

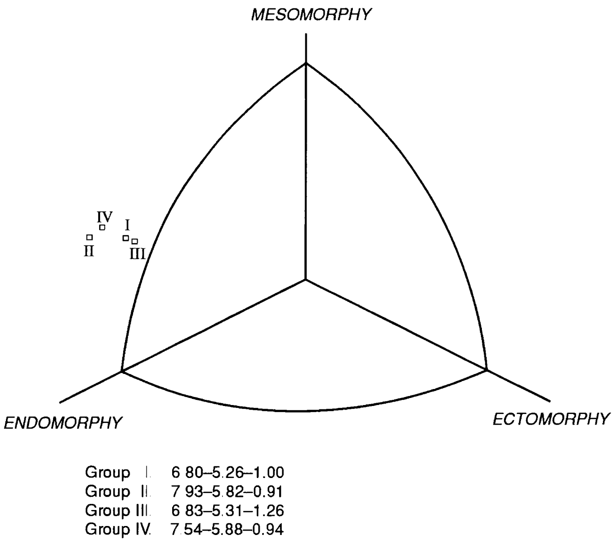

Figure 5. — Mean somatotypes of the four groups investigated.

women with reported obesity occurring in 80% of 154 patients with endometrial carcinoma [16]. Apparently both pre- and postmenstrual women are affected in this regard [17]. Although some studies have demonstrated a strong association between endometrial cancer and adolescent or long-standing obesity, adult body mass is apparently the most important risk factor [18, 19]. Comparing central and peripheral obesity, an independent positive correlation between high ratio of subscapular to triceps skinfold fat and endometrial carcinoma was found. Women with a high ratio of waist to hip circumferences and those with more upper body fat are at higher risk of developing cancer [20]. In another study [21] following adjustment to total body mass no effect of waist-to-hip or trunk-to-limb ratio was found. Obesity associated with increased oestrogen production and the role of ovarian hormones, particularly of oestrogen as a carcinogenic agent in this context, has been commonly hypothesised. The exact mechanism, however, is not yet known.

Since our endometrial carcinoma patients (Group II) were the heaviest (mean body mass was 73.8 kg, Table 4), and following them, the vulvar/vaginal patients (Group IV) were the heaviest (67.4 kg), these higher values of body mass seem to corroborate the findings connected with modest weight loss as reported by Scalafani and Brennan [10].

There has been a hypothesis suggesting that stature is associated with risk of cancer development at certain sites as reviewed by Albanes *et al.* [11]. In spite of conflicting reports, there seems to be a stature-breast cancer relationship. The association was stronger for leg length than for sitting height. Leg length is more sensitive to environmental influences, especially those occurring during adolescence [22]. The explanation for stature-associated cancer risk is unclear and may be related to nutritional factors, especially in childhood and adolescence [11, 23]. Not much has been reported on stature and cancer of the female genital tract. Although a positive trend was demonstrated between Quetelet's index (weight/height) and endometrial cancer, height has not been consistently associated with increased incidence [15].

Table 4. — *Age, body measurements (mean and* SD*) and somatotype of the cancer patient subgroups.*

Characteristics	Group I Ovarian n = 35		Group II Endometrial n = 22		Group III Cervical n = 54		Group IV Vulvar/vaginal n = 24	
Age (years)	63.70	*10.72*	60.53	*8.88*	53.43	*15.29*	67.26	*10.89*
Body mass (kg)	65.70	*12.29*	73.84	*15.18*	65.96	*17.21*	67.38	*11.65*
Sitting height (cm)	82.72	*2.81*	83.56	*4.69*	82.96	*3.52*	81.59	*3.35*
Height (cm)	155.97	*5.59*	157.52	*6.08*	156.47	*6.33*	154.95	*5.97*
Length of upper extremity (cm)	68.60	*3.71*	69.58	*3.48*	69.04	*3.74*	68.41	*2.77*
Length of lower extremity (cm)	84.24	*9.32*	86.49	*4.26*	86.64	*4.87*	85.88	*4.20*
Biacromial width (cm)	35.93	*1.67*	36.82	*1.90*	36.43	*1.83*	35.98	*1.49*
Bi-iliocristal width (cm)	29.77	*1.61*	30.95	*2.07*	29.95	*2.68*	30.65	*1.86*
Chest circumference (cm)	90.06	*6.63*	97.39	*8.66*	89.37	*11.96*	93.16	*9.59*
Upper arm circumference (cm)	26.49	*3.96*	28.89	*3.80*	27.41	*5.48*	28.67	*4.22*
Forearm circumference (cm)	22.89	*2.36*	24.22	*2.31*	23.29	*3.19*	23.63	*2.26*
Thigh circumference (cm)	53.80	*6.54*	57.06	*7.15*	55.13	*8.50*	54.39	*5.00*
Calf circumference (cm)	34.93	*5.83*	35.12	*4.41*	34.46	*5.38*	33.78	*2.97*
Bicondylar humerus (mm)	65.77	*4.26*	68.05	*5.22*	66.00	*7.48*	67.46	*4.94*
Bicondylar femur (mm)	97.23	*7.96*	99.73	*8.78*	96.37	*11.16*	97.63	*5.81*
Skinfold, biceps (mm)	16.26	*6.11*	21.05	*6.93*	17.81	*9.68*	17.92	*6.61*
Skinfold, triceps (mm)	22.83	*6.83*	26.86	*9.76*	23.37	*10.40*	24.92	*8.13*
Skinfold, subscapula (mm)	23.20	*8.44*	30.55	*10.89*	25.31	*12.03*	28.39	*10.99*
Skinfold, suprailiaca (mm)	24.43	*8.81*	32.59	*10.74*	26.83	*12.30*	28.00	*10.90*
Skinfold, umbilicus (mm)	27.47	*8.79*	35.95	*9.89*	31.88	*11.46*	34.58	*11.77*
Skinfold, thigh (mm)	35.06	*10.38*	39.05	*11.78*	37.22	*14.39*	35.27	*11.54*
Skinfold, medial calf (mm)	24.37	*7.71*	24.77	*9.38*	24.06	*9.39*	23.88	*7.18*
Endomorphy	**6.80**	*1.54*	**7.93**	*1.54*	**6.83**	*2.46*	**7.54**	*2.00*
Mesomorphy	**5.26**	*1.82*	**5.82**	*1.81*	**5.31**	*2.32*	**5.88**	*1.53*
Ectomorphy	**1.00**	*0.70*	**0.91**	*0.77*	**1.26**	*1.16*	**0.94**	*0.91*

Conclusion

Our analyses demonstrated that there were no significant differences in the investigated female patients suffering from carcinoma of the genital tract, nor in their body measurements or somatotype. Mean somatotype was 7.13-5.48-1.08, resulting as meso-endomorphic, i.e., the patients with carcinoma of the female genital tract investigated were favourably disposed towards obesity, relatively robust and slightly linear.

References

[1] Eiben O.G.: "The Physique of Woman Athletes". Budapest, 1972, 190.
[2] De Giovanni A.: "Morfologia del corpo umano". 2ª ed., Hoepli, Milan, 1904.
[3] Viola G.: "La constituzione individuale". Cappelli, Bologna, 1932.
[4] Kretschmer E.: "Körperbau und Charakter", 25ª ed., Berlin Springer, 1967.
[5] Sheldon W.H. *et al.*: "The Varieties of Human Physique". New York, Harper and Brothers, 1940.
[6] Heath B.H.: "Need for modification of somatotype methodology". *Am. J. Phys. Anthrop.,* 1963, *21,* 227.
[7] Heath B.H., Carter J.E.L.: "A modified somatotype method". *Am. J. Phys. Anthrop.,* 1967, *24*, 87.
[8] Carter J.E.L., Heath H.B.: "Somatotyping: Development and Applications". Cambridge, Cambridge University Press, 1990.
[9] Brennan M.F.: "Total parenteral nutrition in the cancer patients". *Engl. J. Med.,* 1981, *305*, 375.
[10] Scalafani L.M., Brennan M.G.: "Nutritional support of the gynecologic oncology patient". In: Hoskins W.J., Perez C.A., Young R.C. (eds.). "Principles and Practice of Gynecologic Oncology". Philadelphia, J.B. Lippincott Company, 1992.
[11] Albanes D., Jones D.Y., Schatzkin A., Micozzi M.S., Taylor P.R.: "Adult stature and risk of cancer". *Cancer Res.,* 1988, *48*, 1658.
[12] Tanner J.M., Hiernaux J., Jarman S.: "Growth and physique studies". In: Weiner J.S., Lourie J.A. (eds.). "Human Biology. A Guide to Field Methods". IBP Handbook, no. 9, Oxford, Blackwell Scientific Publications, 1969.
[13] Eiben O.G., Barabás A., Pantó E.: "The Hungarian National Growth Study I. Reference data on the biological developmental status and physical fitness of 3-18 year-old Hungarian youth in the 1980s". *Humanbiologia Budapestinensis,* 1991, *21*, 123.
[14] Eiben O.G.: "About growth of children (in Hungarian with a Russian and French summary)". *Magyar Pedagógia,* Budapest, 1962, 2, 56.
[15] Brinton L.A., Hoover R.N.: "Epidemiology of Gynecologic Cancer". In: Hoskins W.J., Perez C.A., Young R.C. eds. "Principles and Practice of Gynecologic Oncology". Philadelphia, J.B. Lippincott Co., 1992.
[16] Lynch H.R.T., Krush A.J., Larsen A.L., Magnusson C.W.: "Endometrial carcinoma. Multiple primary malignencies, constitutional factors and heredity". *Am. J. Med.,* 1966, *252,* 381.
[17] La Vecchia C., Franceschi S., Decaril A., Gallus G., Tognoni G.: "Risk factors for endometrial cancer at different ages". *J. Natl. Cancer Inst.*, 1984, *73,* 667.
[18] Blitzer Ph., Blitzer E.C., Rimm A.A.: "Association between teenage obesity and cancer in 66,111 women: All cancers and endometrial carcinoma". *Prev. Med.,* 1976, *5*, 20.
[19] Henderson B.E., Casagrande J.T., Pike M.C., Mack T., Rosario I.: "The epidemiology of endometrial cancer in young women". *Br. J. Cancer*, 1983, *47*, 749.
[20] Elliot E.A., Matanokis G.M., Rosenheim N.B.: "Body fat patterning in women with endometrial cancer". *Gynecol. Oncol.*, 1990, *39*, 253.
[21] Folsom A.R., Kaye S.A., Potter J.D., Prineas R.J.: "Association of incident carcinoma of the endometrium with body weight and fat distribution in older women: early findings of the Iowa Women's Health Study". *Cancer Res.*, 1989, *49,* 6828.
[22] Johnston F.E., Wainer H., Thissen D., MacVean R.: "Hereditary and environmental determinants of growth in height in a longitudinal sample of children and youth of Guatemalan and European ancestry". *Am. J. Phys. Anthrop.,* 1976, *44,* 469.
[23] Micozzi M.S.: "Cross-cultural correction of childhood growth and adult breast cancer". *Am. J. Phys. Anthrop.,* 1987, *73,* 525.

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