Uterine Junctional Zone Thickness, Cervical Length and Bioelectrical Impedance Analysis of Body Composition in Women with Endometriosis

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ABSTRACT

Objective: We aimed to evaluate uterine junctional zone thickness, cervical length and bioelectrical impedance analysis of body composition in women with endometriosis.

Material and Methods: This is a prospective study conducted in a tertiary teaching hospital. A total of 73 patients were included in the study. Endometriosis was surgically diagnosed in 36 patients (study group). The control group included 37 patients. Main outcome measure(s): Bioelectrical impedance analysis was used to measure body composition. Uterine junctional zone thickness and cervical length were measured by transvaginal ultrasonography.

Results: Patients’ characteristics (age, gravida, parity, live baby, age of menarche, lengths of menstrual cycle, percentage of patients with dysmenorrhea, positive family history), body mass index (BMI) (kg/m²), amount of body fat (kg), percentage of body fat were not statistically different between the two groups (p>0.05). The length of menstruation and cervical length were longer in women with endometriosis. Similarly, the inner myometrium was thicker in women with endometriosis than the control group.

Conclusion: The relation between endometriosis and demographic features such as age, gravida, parity, gravida, BMI, lengths of the menstrual cycle, age of menarche are controversial. Longer cervical length and thicker inner myometrial layer may be important in the etiopathogenesis of endometriosis.

Key Words: Bioelectrical impedance analysis, cervix, endometriosis, inner myometrium

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Introduction

Endometriosis is one of the most common problems encountered in gynaecology. It affects women in the reproductive years, is associated with pelvic pain and infertility and can seriously impair health.

As a result of the growing amount of knowledge about the novel adipose tissue product, adipokines, adipose tissue has become to be considered one of the main endocrine organs in the human body, with effects on reproductive function, and glucose homeostasis, steroid production, the immune system and hematopoiesis (1). It has long been known that obesity, especially the distribution of adipose tissue in the human body, with effects on reproductive function, and glucose homeostasis, steroid production, the immune system and hematopoiesis (1). It has long been known that obesity, especially the distribution of adipose tissue has an important impact on the reproductive system (1). Besides, the association between body mass index (BMI) and endometriosis has also been studied and concluded that women with endometriosis tend to be thinner (2-4). Similarly, it has been argued that the severity of the disease is associated with BMI. Women with advanced-stage endometriosis in the study had lower BMI than those with minimal or mild disease (5).

Although it has been stated that the changes in uterine internal ostium after vaginal parturition play a protective role in the recurrence of endometriosis and dysmenorrheal, the association between cervical length and endometriosis has not been studied before (6). Similarly, the relation between inner myometrial architectural changes and adenomyosis has been shown, but the inner myometrial changes in women with endometriosis need to be studied (7).

Material and Methods

Study design
This study is a prospective study.

Subjects
From January 2008 through October 2010, patients who underwent surgery (laparoscopy or laparotomy) at the department of obstetrics and gynecology and diagnosed to have endometriosis were included. Ethic committee approval and patients’ informed consents were obtained.

Patients were staged according to the American Society for Reproductive Medicine Revised Classification of Endometriosis (8). Patients in the control group were recruited among women who were proved not to have endometriosis by surgery in the same period of time. Indications for surgery for the patients in the control group were unexplained infertility, suspicious tubal patency on hysterosalpingography,
of patients with dysmenorrhea, positive family history (1st
degree), age of menarche, lengths of menstrual cycle, and body mass index) or
percentage of body fat were performed by using TANITA
body composition analyzer BC-420MA (foot to foot) (Japan)
without dehydrating the patient. The inner myometrium was measured from a point near the uterine fundus at a sagittal plane while
2/3 of the uterus was placed on the screen. Cervical length
was measured at the same magnification from the point of the internal os to the distal end of the cervical canal on screen by
using the short-cut mode of the ultrasound. Eight candidate
patients for the study group and 1 candidate patient for the
control group whose inner myometrium (halo formation) could not be identified were excluded from the study.

Anthropometric measurements (weight, body mass index, percentage of body fat) were performed by using TANITA
body composition analyzer BC-420MA (foot to foot) (Japan)
with an empty bladder after 8 hours fasting without dehydrating
the patient. The reliability of bioimpedance analysis in measuring
body fat composition has been shown in many studies (9-13).

Statistical analysis
SPSS for Windows 11.5 (Chi., IL., USA) statistics package
program was used for statistical analysis. Descriptive statis-
tics were presented as mean, standard deviation, median, minimum, maximum, frequencies and percentages. The Kolmogorov-Smirnov test was used to determine normal dis-
tribution of the continuous data. Continuous variables were analysed with independent samples t test (age, age of menarche, lengths of menstrual cycle, and body mass index) or Mann-Whitney U test (gravida, parity, live baby, percentage of patients with dysmenorrhea, positive family history (1st
degree), amount of body fat, percentage of body fat, cervical length, inner myometrium, and the length of menstruation) as appropriate. Pearson chi-square test and Fisher’s exact test were used to compare categorical variables. A p value <0.05 was considered statistically significant.

Results
A total of 73 patients were included in the study. All pa-
patients in the study group were in advanced stage endometri-
ysis (24 patients with stage 4 and 12 patients with stage 3).
Patient characteristics are shown in Table 1. The mean of the
lengths of the menstrual cycle and the age of menarche in the
control group was 29.19±5.76 and 13.65±1.23 respect-
ively. However, the median of the length of menstruation
was statistically different between study and control groups
(p=0.025). The percentage of women who have dysmenor-
rhea was 66.6% in the study group and 45.9% in the control
group. Endometriosis was present in the family history (1st
degree) of 2.77% of patients in the study group. None of the patients in the control group had a family history of endome-
triosis (Table 1). Body mass index and percentage of body fat
values were not statistically different (p>0.05). Mean BMI was
25.68±5.34, and percentage of fat mass 20.78% in the study
group. Mean BMI was 24.37±3.52, and percentage of fat mass
23.70% in control group. The median of the lengths of uterine
cervix were statistically different in the groups (p=0.001). The
mean cervical length in the study group was 36.30±8.25 mm,
but it was 29.33±7.11 mm in the control group. The median
inner myometrial thicknesses were statistically different in the
groups (p=0.001). The mean inner myometrial thicknesses in
the study and in the control group were 5.67±2.22 mm and
4.16±1.92 mm respectively (Table 2).

Discussion
A study with a large prospective cohort showed that pa-
tients with a family history of endometriosis were more likely
to have endometriosis. However, the mode of inheritance is
still uncertain. It is also stated that the age of menarche and
lengths of the menstrual cycle and BMI are not risk factors for
endometriosis and that the risk decreases when regular menses
begin after 12-23 months after menarche (14). Similarly, in
our study, we could not find a difference in age of menarche
and the lengths of the menstrual cycle in the groups with and
without endometriosis. However, the median length of men-
struation was longer in women with endometriosis. Also the
family history was positive in 2.8% of patients in group with
endometriosis.

We have not determined statistically significant differences
in the amount of body fat or percentage of body fat by using
the Bioelectrical Impedance Analysis between the groups.
Mean Body Mass Index of both groups were also not statisti-
cally different. In the literature, although we have not encoun-
tered any study that searches the relation between endome-
triosis and the amount of body fat or percentage of body fat
by using Bioelectrical Impedance Analysis, it is concluded in
a study searching the relation between BMI and endometrio-
sis that women with advanced-stage endometriosis had lower
BMIs than those with minimal or mild disease, and BMI was
significantly associated with disease severity (15). Likewise,
in another study including 32 patients with endometriosis
and 52 healthy women, a lower BMI was detected in the
study group. It is stated that for every unit increase in BMI,
there was an approximate 12-14% decrease in the likelihood
of being diagnosed with endometriosis (16). A more recent
study by Vitosis AF et al showed a persistent inverse associa-
tion between childhood and early adulthood body size and
incidence of laparoscopically confirmed endometriosis. This
was independent of adult BMI and menstrual cycle charac-
teristics (17). However, our study did not show such a relation
in BMI and advanced staged endometriosis. This might result
from ethnic reasons.

Transvaginal ultrasonography is a proper method for
measuring the cervical length. Although there are many
studies about cervical length in pregnancy in the literature,
we could not find a study related to cervical length in non-pregnant women with endometriosis. In our study, mean cervical length in the study group (36.30±8.25 mm) was longer than in the control group (29.33±7.11 mm). Similarly, median cervical length was longer in the study group and this was also statistically significant between both groups. We think that this difference may potentiate retrograde menstruation and/or inner myometrial dyssynergia that may
have a possible role in the etiopathogenesis of endometriosis. The shown relation between inner myometrial architectural changes and adenomyosis can also be present between endometriosis and inner myometrium because endometriosis and adenomyosis result from the same physiological mechanism of “tissue injury and repair” involving local estrogen production in an estrogen-sensitive environment normally controlled by the ovary (7, 18).

In the literature there is evidence that support the possible role of uterine junctional zone dysfunction in subfertility and etiopathogenesis of endometriosis (19-21). Dysperistaltism was also proposed to be responsible for the higher incidence of endometriosis in patients with a septate uterus in another study (22). Inner myometrial thickness of ≤5 mm is accepted as normal (23). In our control group, the mean inner myometrial thickness was 4.16±1.92 mm which was consistent with the literature. We think that statistically higher inner myometrial thickness in our study group could be related to inner myometrial hyperplasia or dysperistaltism that may have a role in developing endometriosis.

**Conclusion**

The relation between endometriosis and demographic features such as age, gravidity, parity, gravidity, BMI, lengths of the menstrual cycle and age of menarche are controversial. Longer cervical length and thicker inner myometrial layer may be important in the etiopathogenesis of endometriosis.

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**Conflict of Interest**

No conflict of interest was declared by the authors.

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