

# Assessment of pain and stress intensity among women with ovarian endometriomas versus teratomas

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**BACKGROUND:** In recent years, numerous studies have considered endometriosis to be a subclinical, local inflammatory process in the pelvic peritoneum, the main symptom of which is pain.

**OBJECTIVES:** To assess pain intensity and pain-related stress in women with ovarian endometriomas versus teratomas.

**METHODS:** In total, 860 women (18 to 38 years of age) treated laparoscopically for lesions in the adnexa between September 2006 and November 2013 were included in the present study. After an intraoperative review of their histopathological lesions, the patients were divided into two study groups: group E (n=480), with histopathologically confirmed ovarian endometriomas; and group T (n=380), after laparoscopic treatment of ovarian teratomas. A questionnaire was generated for the study and completed by each group. Statistical analysis was performed using the Mann-Whitney U test ( $P \leq 0.05$ ).

**RESULTS:** Median pain scores for group E versus group T were as follows: pain during menstruation, 6 versus 3 ( $P=0.001$ ); pain outside of menstruation (in professional life), 2 versus 2 ( $P=0.014$ ); and pain during sexual intercourse, 3 versus 1 ( $P=0.006$ ). Pain-related stress scores were higher in group T versus group E (5 versus 3;  $P=0.007$ ).

**CONCLUSION:** Ovarian endometriomas caused more pain than ovarian teratomas, likely due to the endometrial tissue component and not a mass effect. The assessment of pain and pain-related stress associated with the pelvis minor showed a high level of pain intensity and lower level of pain-related stress among patients with ovarian endometriomas.

**Key Words:** Chronic pelvic pain syndrome; Ovarian endometriomas; Ovarian teratoma

Endometriosis is a chronic, estrogen-dependent disease characterized by endometrial hyperplasia outside of the uterine cavity. Endometriosis can manifest as peritoneal grafts and adhesions, as well as endometrial cysts (1-3). The etiopathogenesis of ovarian endometriomas has yet to be clearly defined (3). In recent years, numerous studies have considered endometriosis to be a subclinical, local inflammatory process, the main symptom of which is pain (1).

Endometriosis affects 6% to 15% of the general female population, with its peak incidence typically occurring between 30 and 40 years of age (4-6). Incidence is higher among women treated for pain of the pelvis minor (40% to 60%) (5,6). Endometriosis also affects younger women and approximately 3% (between 2% and 5%) of women after menopause (4,5). The prevalence of endometriosis (45% to 70%) in women with chronic pelvic pain syndrome increases with age (7). The main symptom of endometriosis is chronic pain with a typical, periodic nature, and intensity of perimenstrual symptoms (maximum intensity during menstruation). Endometriosis does not necessarily negatively

## L'évaluation de l'intensité de la douleur et du stress chez les femmes ayant des endométriomes comparativement à des tératomes ovariens

**HISTORIQUE :** Ces dernières années, de nombreux articles ont défini l'endométriose comme un processus inflammatoire local et subclinique du péritoine pelvien, dont le principal symptôme est la douleur.

**OBJECTIFS :** Évaluer l'intensité de la douleur et le stress lié à la douleur chez des femmes ayant des endométriomes comparativement à des tératomes ovariens.

**MÉTHODOLOGIE :** Au total, 860 femmes de 18 à 38 ans traitées par voie laparoscopique pour des lésions des annexes entre septembre 2006 et novembre 2013 ont été incluses dans la présente étude. Les patientes, après examen intraopératoire de leurs lésions histopathologiques, ont été divisées en deux groupes d'étude : le groupe E (n=480) ayant des endométriomes ovariens confirmés par histopathologie, et le groupe T (n=380), après le traitement laparoscopique de tératomes ovariens. Le questionnaire, créé pour l'étude, a été utilisé dans les deux groupes. L'analyse statistique a fait appel au test U de Mann-Whitney ( $P \leq 0,05$ ).

**RÉSULTATS :** Les scores de douleur médian du groupe E s'établissaient comme suit par rapport à ceux du groupe T : douleur pendant les menstruations, 6 par rapport à 3 ( $P=0,001$ ), douleur entre les menstruations, dans la vie professionnelle, 2 par rapport à 2 ( $P=0,014$ ) et douleur pendant les relations sexuelles, 3 par rapport à 1 ( $P=0,006$ ). Les scores de stress liés à la douleur étaient plus élevés dans le groupe T que dans le groupe E (5 par rapport à 3;  $P=0,007$ ).

**CONCLUSION :** Les endométriomes ovariens sont plus douloureux que les tératomes ovariens, probablement en raison du tissu endométrial plutôt que d'un effet de masse. L'évaluation de la douleur du petit bassin et du stress causé par cette douleur a révélé une douleur de forte intensité et un faible stress lié à la douleur chez les patientes ayant des endométriomes ovariens.

impact quality of life. Women with endometriosis may adapt to the disease; a high level of disease acceptance may mitigate the negative impact on psychosocial functioning.

The purpose of the present study was to assess pain intensity and accompanying stress in women with ovarian endometriomas versus teratomas.

## METHODS

The present prospective study involved 860 women (18 to 38 years of age) treated laparoscopically at the Obstetrics and Gynaecology Hospital of the Poznan University of Medical Sciences (Poznan, Poland) for lesions in the adnexa (ovarian endometriomas and ovarian teratomas), between September 2006 and November 2013. Inclusion criteria were as follows: unburdened obstetric history; good health without any accompanying diseases; and intraoperative diagnosis of ovarian endometriomas or ovarian tumour in the form of a mature teratoma (patients with dual pathology were excluded). Exclusion

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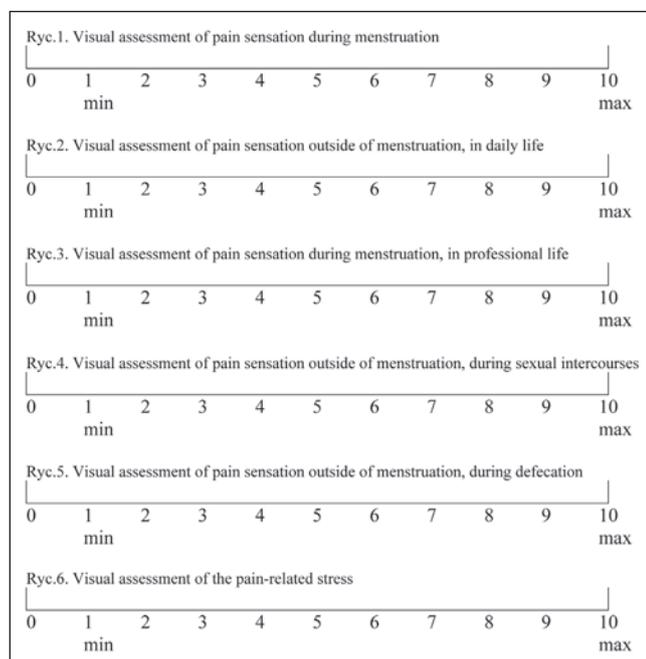


Figure 1) Pain sensation and Pain Distress Scale

criteria included burdened obstetric history and history of treatment for infertility, irregularities in the blood coagulation system and menstrual disorders. No irregularities in the blood coagulation system were observed during the preoperative tests, and the patients also had no history of treatment for infertility.

The laparoscopy was performed during the first stage of the menstrual cycle in all patients. The women were divided into groups based on histopathological assessment: group E (n=480; histopathologically confirmed ovarian endometrioma) and group T (n=380; mature teratoma). Other endometrial implants and their locations and type were not taken into account.

Before surgery, all women with ovarian tumours suggestive of endometrioma or mature teratoma were asked to complete a questionnaire concerning socioeconomic characteristics, marital status, education, place of residence, smoking status, professional activity, and menstrual and obstetrical history (number of deliveries and miscarriages). In addition, the questionnaire included a yes/no question regarding whether the patient experienced pain. Using a numerical rating scale (NRS) of pain intensity (the Pain Sensation Scale, on which 0 = no pain and 10 = maximum pain), the patients were asked to rate their degree of pain intensity during and outside of menstruation in everyday and professional life, and outside of menstruation during sexual intercourse and defecation. The level of pain-related stress was evaluated using the Pain Distress Scale (on which 0 = no stress and 10 = maximum stress) (8). Patients completed the questionnaire alone, without the assistance of others (Figure 1).

#### Statistical analysis

Qualitative data regarding the characteristics of the study participants are presented as numerical values for individuals according to category (n) and percentage according to group (%). The  $\chi^2$  independence test was used to compare qualitative properties between the groups (ie, marital status, education, place of residence, smoking status, professional activity, and number of deliveries and miscarriages). Age, body weight, height and diameter of lesions in the adnexa were compared between the groups using the nonparametric Mann-Whitney-Wilcoxon test. The degree of pain intensity was assessed using a survey evaluating the degree of pain sensation (Pain Sensation Scale) and accompanying level of stress (Pain Distress Scale) (8). The statistical analysis of the results was performed with

TABLE 1  
General characteristics of patients with ovarian endometriomas (group E) and teratomas (group T)

|                                       | Group E (n=480) | Group T (n=380) | P      |
|---------------------------------------|-----------------|-----------------|--------|
| Age, years                            | 30.19±4.70 (31) | 27.31±4.25 (26) | 0.002* |
| Body mass index, kg/m <sup>2</sup>    | 23.42±7.01 (23) | 22.01±6.07 (22) | 0.396  |
| Diameter of lesion in left ovary, mm  | 48.24±17.63     | 44.53±10.29     | 0.475  |
| Diameter of lesion in right ovary, mm | 49.17±14.76     | 48.61±15.07     | 0.874  |
| Age at first menstruation, years      | 13.65±0.89 (14) | 13.79±1.78 (14) | 0.072  |
| Length of menstrual cycle, days       | 28.46±2.13 (28) | 28.72±1.47 (28) | 0.065  |
| Duration of menstruation, days        | 5.74±1.49 (6)   | 4.96±1.56 (5)   | 0.021* |

Data presented as mean ± SD or mean ± SD (median). \*Level of statistical significance in the Mann-Whitney test

the Mann-Whitney-Wilcoxon test;  $P < 0.05$  was considered to be statistically significant. Statistical calculations were performed using STATISTICA software (StatSoft, USA).

The study was approved by the Bioethics Commission at the Poznan University of Medical Sciences. The study was financed using science funds from 2009-2013 (Research Project No. N N404 195037).

## RESULTS

### Comparison of general characteristics (Table 1)

Group E and group T were significantly different with regard to median age (31 years versus 26 years;  $P = 0.002$ ) and duration of menstruation (approximately six days versus five days;  $P = 0.021$ ).

Ovarian endometriomas were most often observed among unmarried women (54.2%) with secondary-school education (60.4%) residing in towns with <5000 residents (64.6%). Mature teratomas were more often diagnosed in married women (58.0%) with higher education (52.6%) residing in towns with <5000 residents (47.4%).

### Pain analysis (Table 2)

Pain was analyzed with regard to the occurrence of pain or the lack thereof. Chronic abdominal pain was observed in more than one-half of the patients, regardless of the type of lesion (group E, 52.1% versus group T, 55.3%;  $P = 0.916$ ). Painful menstruation was significantly more frequently reported by women with ovarian endometriomas than those with teratomas (70.8% versus 39.5%;  $P < 0.001$ ). Furthermore, pain during intercourse was significantly more frequently reported in patients with ovarian endometriomas than patients with teratomas (41.7% versus 13.2%;  $P < 0.006$ ).

### Visual assessment of pain and pain-related stress (Table 3)

On an NRS, patients rated their degree of pain intensity and pain-related stress on a scale of 0 to 10 (0 = no pain/stress and 10 = maximum pain/stress). The median pain intensity score during menstruation was 6 in patients with endometriomas and 3 in patients with teratomas ( $P = 0.001$ ). Statistically significant differences were also observed for the intensity of pain, during menstruation, in professional life (median scores 2 versus 2;  $P = 0.014$ ) and during sexual intercourse (3 versus 1;  $P = 0.006$ ). The degree of pain-related stress was higher in group T than in group E (5 versus 3;  $P = 0.007$ ).

## DISCUSSION

The main symptom of endometriosis is chronic pain with a typical, periodic nature, and intensity of perimenstrual symptoms (maximum intensity during menstruation). Patients most frequently report pain during menstruation, or dyspareunia, dysuria, painful defecation, sacral pain, discomfort or periodical abdominal pain, flatulence and diarrhea. However, gastrointestinal and urinary disorders are rarely observed

**TABLE 2**  
Occurrence of pain in patients with ovarian endometriomas (group E) and teratomas (group T)

| Pain                                  | Group E (n=480) | Group T (n=380) | P       |
|---------------------------------------|-----------------|-----------------|---------|
| Chronic abdominal pain                | 250 (52.1)      | 210 (55.3)      | 0.916   |
| Pain during menstruation              | 340 (70.8)      | 150 (39.5)      | <0.001* |
| Intensity of pain during menstruation | 370 (77.1)      | 230 (60.5)      | 0.154   |
| Pain during everyday activities       | 70 (14.6)       | 40 (10.5)       | 0.672   |
| Pain during gynecological examination | 100 (20.8)      | 90 (23.7)       | 0.945   |
| Pain during sexual intercourse        | 200 (41.7)      | 50 (13.2)       | 0.006*  |
| Pain during urination                 | 0 (0)           | 0 (0)           |         |
| Pain during defecation                | 30 (6.3)        | 0 (0)           | 0.128   |

Data presented as n (%). \*Statistically significant at  $P < 0.05$  according to the Mann-Whitney test

during the course of the disease (4,5). Due to nonspecific clinical symptoms and an asymptomatic course, endometriosis is often diagnosed incidentally (eg, during procedures). An initial diagnosis of endometriosis can be made if there has been persistent abdominal pain for  $\geq 6$  months, regardless of the stage of menstrual cycle and intensity of perimenstrual symptoms (4). Ovarian endometriomas may be painful due to the presence of endometrial tissue, or the pain may be related to adhesions or mass effect on adjacent tissue (7,9-11).

Numerous adhesions formed during the course of the disease may impair the proper functioning of internal organs. The relationship between adhesions and the degree of pain has not been fully elucidated. Statistically, pain more often accompanies thin adhesions in the course of minimal and benign endometriosis, as well as ovarian endometriosis (12). Continuous changes in peritoneal tension and anatomy may explain chronic pain due to adhesions located on the surface of the ovaries and peritoneum (12,13). The degree of pain in endometriosis is not proportional to the stage of its progression. Small foci of peritoneal endometriosis may cause strong pain, whereas large cysts may be completely asymptomatic (3).

Endometrial pain is subjective, and numerous methods have been used to assess the degree of pain. The visual analogue scale is the most frequently used pain scale and, together with NRS, appears to be the best adapted for endometriosis pain measurement (14). An accurate assessment of pain in patients is a prerequisite to determine suitable pain management options. The assessment of pain should include the correct estimation of its intensity and the determination of its type. Moreover, it is important in the assessment of pain to include its temporal pattern (ie, whether it has a continuous or paroxysmal nature). It should be emphasized that it is necessary not only to determine the type and intensity of pain, but also to assess the psychological and social issues of the patients and their family. Numerical scales, visual analogue scales or verbal assessments of pain intensity are most often used to assess the pain (8). However, these scales, although sufficient to assess the intensity of pain, are unidimensional. An NRS was used to assess pain intensity in the present study. According to the respondents, the median pain intensity during menstruation was 6 (on a scale of 0 to 10) in the group of women with ovarian endometriomas, compared with a score of 3 in women with teratomas ( $P=0.001$ ). Statistically significant differences were also observed for the intensity of pain outside of menstruation, in professional life ( $P=0.014$ ) and during sexual intercourse ( $P=0.006$ ), with group E reporting higher pain intensities. However, the degree of pain-related stress was higher in group T than in group E (median scores, 5 versus 3;  $P=0.007$ ). The question is: why do these women have less stress than those with ovarian endometriomas?. As mentioned, ovarian endometriomas may be painful because of their endometrial tissue composition, or due to a mass effect. In the present study, the ovarian endometriomas and teratomas were not significantly different in size, thus effectively negating the mass effect. Therefore, the increased pain in group E was likely due to endometriosis.

**TABLE 3**  
Analysis of visual assessment of pain sensation and pain-related stress in patients with ovarian endometriomas (group E) and teratomas (group T)

|  | Group E             | Group T             | P      |
|--|---------------------|---------------------|--------|
| 1. Pain sensation during menstruation                                | 6 (5.47 $\pm$ 2.38) | 3 (3.49 $\pm$ 2.23) | 0.001* |
| 2. Pain sensation outside of menstruation, in daily life             | 2 (1.83 $\pm$ 1.65) | 1 (2.29 $\pm$ 2.14) | 0.672  |
| 3. Pain sensation during menstruation, in professional life          | 2 (2.06 $\pm$ 1.63) | 2 (1.57 $\pm$ 1.42) | 0.014* |
| 4. Pain sensation outside of menstruation, during sexual intercourse | 3 (2.40 $\pm$ 1.97) | 1 (1.84 $\pm$ 1.69) | 0.006* |
| 5. Pain sensation outside of menstruation, during defecation         | 2 (1.19 $\pm$ 1.28) | 1 (1.27 $\pm$ 1.17) | 0.128  |
| 6. Pain-related stress   | 3 (3.38 $\pm$ 2.35) | 5 (4.16 $\pm$ 1.97) | 0.007* |

Data presented as median (mean  $\pm$  SD) unless otherwise specified. \*Statistically significant at  $P < 0.05$  according to the Mann-Whitney test

Petrelluzzi et al (15) observed that women with endometriosis and chronic pelvic pain report a high level of perceived stress, associated with a poorer quality of life, compared with healthy female volunteers. Despite being sufficient to assess the intensity of pain, the NRS is unidimensional and does not consider the mental condition of the patients. A limitation of the study was that other endometriotic implants and their locations and type were not taken into account. The limitations, as reported in Petrelluzzi et al (15), are related to the pain measures and, most likely, the stress measure. We also did not include the type and dosage of analgesics; clearly, it is necessary to perform further, controlled clinical studies. A study by De Graaff et al (16) investigated the effect of endometriosis-associated symptoms and health-related quality of life on education, work and social well-being. Their results revealed that endometriosis affected work and relationships in 51% and 50% of participants, respectively, at some time during their life. Dysmenorrhea was reported by 59%, dyspareunia by 56% and chronic pelvic pain by 60% of women. Quality of life was decreased in all eight dimensions (16). A study by Łuczak et al (17) included an analysis and psychological profile of women with endometriosis (17). This study assessed the quality of life and methods of coping with the negative effects of endometriosis by means of psychological tests. Professionally active women with higher education (65.4%) and white collar workers (61.5%), who had been diagnosed with endometriosis for one to 13 years (4.4 years on average) were evaluated, with interesting results. No intensification of depression symptoms was observed in women with endometriosis; in fact, they had a high level of life satisfaction. To manage their pain, the patients used strategies of prayer/seeking hope and reported coping in situations of pain. They suppressed their anger and evaluated relationships and family support in a positive manner. They had a high level of disease acceptance, which enabled them to avoid the negative impact on psychosocial functioning. They also had a high level of belief in their self-efficacy, proving their appreciation of their own resources in difficult and stressful situations (17). Endometriosis, as a chronic disease, does not necessarily reduce quality of life. Its presence leads patients to utilize their individual resources to attain their set goals and fulfill important needs. Women with endometriosis adapt to the disease, enabling them to maintain good relations with their closest friends and relatives, execute plans and feel a high degree of internal satisfaction with life (17).

Pain from ovarian endometriomas may be a result of the endometrial tissue component of these lesions (3,18). The assessment of pain remains an important element of analgesic management in women with endometriosis. However, clinical studies in this regard are relatively scarce, compared with attempts to use new methods of pain treatment, especially within pharmacotherapy.

## CONCLUSIONS

Ovarian endometriomas may cause pain because of their endometrial tissue component rather than strictly a mass effect. The assessment of pain related to the pelvis minor showed a high level of pain intensity and lower level of stress related with the pain among patients with ovarian endometriomas compared with those with ovarian teratomas.

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**DISCLOSURES:** The authors have no conflicts of interest to declare.

**IN MEMORIAM:** This article is dedicated to the memory of Professor Tomasz Opala.

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