“Kissing ovaries”: a sonographic sign of moderate to severe endometriosis

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Objective: To evaluate whether the presence of kissing ovaries at ultrasound is a marker for endometriosis and whether it correlates with the severity of the disease.

Design: Prospective observational study.

Setting: Gynecologic departments of two university hospitals.

Patient(s): A total of 722 consecutive premenopausal women who had laparoscopic surgery for an adnexal mass or suspected pelvic endometriosis.

Intervention(s): Preoperative ultrasound evaluation and laparoscopic surgery.

Main Outcome Measure(s): Diagnostic and predictive value of ultrasound identification of kissing ovaries in the detection of endometriosis.

Result(s): Kissing ovaries were diagnosed at ultrasound and confirmed laparoscopically in 32 patients. Of these, 27 had moderate to severe endometriosis and five others had benign adnexal masses. Bowel (18.5% vs. 2.5%) and fallopian tube (92.6% vs. 33%) endometriosis were significantly more frequent in patients with kissing ovaries than in patients without kissing ovaries. In infertile patients (n = 145), kissing ovaries were associated with a higher proportion of women with fallopian tube obstruction (80% vs. 8.6%). Considering patients with moderate to severe endometriosis (n = 189), the median (range) revised American Fertility Society score (74 [32–148] vs. 35 [16–146]) and the operative time (115 minutes [65–245 minutes] vs. 50 [15–180 minutes]) were significantly higher in patients with than in those without kissing ovaries.

Conclusion(s): The detection of kissing ovaries at ultrasound is strongly associated with the presence of endometriosis and is a marker of the most severe form of this disease. (Fertil Steril 2005;83:143–7. ©2005 by American Society for Reproductive Medicine.)

Key Words: Endometriosis, kissing ovaries, ultrasound, laparoscopy, bowel endometriosis

A number of scores have been proposed to interpret the gray-scale ultrasound appearance of pelvic masses to differentiate benign from malignant tumors (1, 2). The accuracy of transvaginal ultrasound in evaluating pelvic cysts suspected to be endometriomas has been widely evaluated (4, 5). Moreover, the possibility of implementing the conventional ultrasound assessment of the female pelvis with the use of color Doppler and power Doppler imaging techniques has further refined the ability to correctly diagnose endometriomas (6–8).

However, even when endometriosis is suspected preoperatively, the difficulty in evaluating its extension remains a major limitation. Previously published studies propose some tools for preoperative counseling on the basis of the ultrasound appearance of the ovarian cysts and their relation to the anatomical location of the lesions (9–11). It has been reported that the involvement of the left side of the pelvis is associated with a higher recurrence risk and with a worse pregnancy outcome than endometriosis limited to the right pelvic side (9, 10). Recently, Dessole et al. described a new procedure, which is based on transvaginal ultrasound combined with the introduction of saline solution in the vagina to enhance the identification of rectovaginal endometriosis (11).

An improved preoperative assessment of endometriosis, particularly the identification of severe forms of the disease, would allow for better planning of surgery. In these cases, it is common to observe that the ovaries, although sonographically normal, are entirely or partly joined together and stabilized behind the uterus in the pouch of Douglas (so-called kissing ovaries) at the time of laparoscopy. Therefore, we sought to assess the accuracy of preoperative transvaginal ultrasound in correctly identifying the presence of kissing ovaries and to establish whether this finding correlates with the severity of endometriosis.

MATERIALS AND METHODS

Consecutive premenopausal women with an adnexal mass or with clinical signs suggestive of pelvic endometriosis and scheduled for laparoscopic surgery between January 1, 2000, and November 30, 2003, were enrolled at the participating institutions. Exclusion criteria were [1] previous surgical...
intervention on the adnexae or the uterus, [2] history of breast, gastrointestinal tract, or genitourinary tract malignancy, [3] history of infertility without symptoms or signs of endometriosis, and/or [4] clinical or ultrasound suspicion of malignancy. The study was approved by the Ethical Research Committee of the participating institutions.

Ultrasound evaluation of the pelvis was performed with commercially available ultrasound units (Sequoia 512, Acuson, Mountain View, CA; Aloka 1700 Dyna view II, Aloka, Tokyo) equipped with a 5-/7.5-MHz transvaginal probe. Using B-mode, an ovarian endometrioma was suspected in the presence of round-shaped cysts with thick walls, regular margins, and homogeneous low echogenicity. The diagnosis of “kissing ovaries” was made when both ovaries were joined together behind the uterus in the cul-de-sac (Fig. 1) and were not separable by pushing the transvaginal probe and by moving the uterus transabdominally. The presence of definite endometriomas was not a prerequisite for the diagnosis of kissing ovaries (Fig. 2).

All ultrasound examinations were performed within 1 week before surgery by three of the authors. Each case was classified (kissing ovaries or not), electronically stored, and sent to the other two authors for review. In case of a discordant opinion, an agreement was reached after a collegial discussion of the case. If isolated peritoneal endometriotic foci were found at surgery in case of a nonendometriotic adnexal mass, the patient was classified in accordance with adnexal mass histology.

Bladder endometriosis was defined as the presence of lesions infiltrating the muscle layer of the bladder wall with spillage of urine after the removal of the lesion. Ureteral endometriosis was considered to be present when endometriotic tissue was responsible for a ureteral stenosis requiring ureterolysis. Bowel endometriosis was considered to be present when one or more nodules were touching the muscle layer of the intestinal wall and the bowel mucosa was visible or cut after the removal of the nodules. Fallopian tube involvement was considered to be present in the presence of dense adhesions distorting and dislocating at least one fallopian tube.

Operative laparoscopy was performed by video control through an umbilical incision and two or three lower abdominal incisions. Instrumentation included 5-mm scissors and graspers. Irrigation was performed with lactated Ringer’s solution, and hemostasis was achieved with bipolar coagulation. Lysis of adhesions was performed with the use of sharp dissection to fully mobilize the ovaries. In the presence of endometriosis, the surgical goal was the complete excision of all lesions. In the presence of ovarian endometriomas, one of the following techniques was used: [1] stripping of the inner lining of the cyst from the normal ovarian tissue, [2] unilateral salpingo-oophorectomy, and [3] bilateral salpingo-oophorectomy. In infertile patients, laparoscopic tubal patency was assessed by chromopertubation. All surgical specimens were sent for histological examination. Pathologic descriptions consistent with endometrial glands and stroma were considered endometriosis. Descriptions of hemosiderin-laden macrophages alone, although suspected of being endometriosis, were not considered clear evidence of the disease.

Cases of endometriosis were classified into four groups according to the revised American Fertility Society (rAFS) classification (12). Statistical analysis was performed with GraphPad Prism version 3.00 for Windows (GraphPad Software, San Diego). The Mann-Whitney U-test and Fisher’s exact test were
used to compare continuous variables and proportions, respectively. \( P < .05 \) was considered statistically significant.

**RESULTS**

A total of 722 women were enrolled in the study. Twelve cases were excluded for the following reasons: in six cases a uterine myoma was misdiagnosed as an adnexal mass, in four cases a malignant ovarian tumor was revealed at frozen section examination, in one case an appendicular mucocele was erroneously diagnosed as a sactosalpinx, and in one case a large lymphocyst was misdiagnosed as an ovarian cyst. A total of 309 women underwent ultrasound and laparoscopy because of clinical or ultrasound signs suggestive of endometriosis. In the remaining cases, surgery was performed for an adnexal mass nonsuggestive of endometriosis.

Among the patients who underwent laparoscopy for suspected endometriosis (chronic pelvic pain, dyspareunia, dysmenorrhea), a normal pelvis was found at laparoscopy in 21 cases. In nine cases, a benign adnexal mass was misdiagnosed as an endometrioma. In 20 cases, mono-/bilateral endometriomas were misdiagnosed as nonendometriotic benign adnexal tumors.

Kissing ovaries were diagnosed in 32 (4.4%) patients at preoperative ultrasound. Laparoscopy confirmed the presence of joined ovaries in the pouch of Douglas, adherent to surrounding tissue in all cases. **Table 1** displays the histological findings of the study population according to the ultrasound appearance of the ovaries.

Pelvic endometriosis was present in 309 (43.5%) cases. The rAFS classification and location of the disease are presented in **Table 2**. Among patients with moderate to severe endometriosis (\( n = 189 \)), the median rAFS score was significantly higher in those with the ultrasound presence of kissing ovaries than among patients without kissing ovaries (median, 74; range, 32–148; vs. median, 35; range 16–146; \( P < .001 \)). The median (range) operative time was significantly longer in the former than in the latter group of patients (115 minutes [65–245 minutes] vs. 50 minutes [15–180 minutes]; \( P < .001 \)). Considering only patients with bilateral ovarian endometriomas (\( n = 45 \)), the median (range) rAFS score (74 [50–148] vs. 49 [21–146]; \( P < .005 \)) and the median operative time (135 minutes [90–245 minutes] vs. 65 minutes [40–135 minutes]; \( P < .001 \)) were significantly higher in patients with (\( n = 13 \)) than in those without (\( n = 32 \)) kissing ovaries. Among patients with unilateral endometriomas (\( n = 126 \)), those with kissing ovaries at ultrasound (\( n = 9 \)) had a higher median (range) rAFS score (80 [32–128] vs. 33 [19–120]; \( P < .005 \)) and a longer median operative time (110 minutes [65–185 minutes] vs. 65 minutes [20–180 minutes]; \( P < .005 \)) than women without kissing ovaries (\( n = 117 \)). Among patients without definite endometriomas (\( n = 138 \)), those with ultrasound kissing ovaries (\( n = 5 \)) had a higher median (range) rAFS score (75 [32–106] vs. 8 [1–30]; \( P < .005 \)) and a longer median operative time (80 minutes [65–100 minutes] vs. 35 minutes [15–70 minutes]; \( P < .005 \)) than women without kissing ovaries (\( n = 133 \)).

The most severe form of pelvic endometriosis (rAFS \( \geq 70 \)) was more frequent among patients than among those without kissing ovaries (16/32 [50.0%] vs. 27/678 [4.0%]; \( P < .0001 \)). The presence of dense adhesions requiring surgical lysis between the adnexae and the sigmoid was significantly higher in patients with endometriosis than in those

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Absence of kissing ovaries (( n = 678 ))</th>
<th>Presence of kissing ovaries (( n = 32 ))</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serous cystoadenoma</td>
<td>144 (21.2)</td>
<td>0</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Mucinous cystoadenoma</td>
<td>91 (13.4)</td>
<td>1 (3.1)</td>
<td>.07</td>
</tr>
<tr>
<td>Dermoid cyst</td>
<td>67 (9.9)</td>
<td>1 (3.1)</td>
<td>.35</td>
</tr>
<tr>
<td>Luteal cyst</td>
<td>24 (3.5)</td>
<td>0</td>
<td>.69</td>
</tr>
<tr>
<td>Pelvic endometriosis*</td>
<td>282 (41.6)</td>
<td>27 (84.4)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Ovarian leiomyoma</td>
<td>4 (0.6)</td>
<td>0</td>
<td>.66</td>
</tr>
<tr>
<td>Hydrosalpinx</td>
<td>18 (2.6)</td>
<td>1 (3.1)</td>
<td>.58</td>
</tr>
<tr>
<td>Pelvic abscess</td>
<td>15 (2.2)</td>
<td>2 (6.2)</td>
<td>.17</td>
</tr>
<tr>
<td>Borderline ovarian tumor</td>
<td>8 (1.2)</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>Normal pelvis(^b)</td>
<td>21 (3.1)</td>
<td>0</td>
<td>.61</td>
</tr>
<tr>
<td>Others</td>
<td>4 (0.6)</td>
<td>0</td>
<td>.66</td>
</tr>
</tbody>
</table>

**Note:** Data are presented as number (%).

\(^a\)Histological confirmation obtained for 243 cases.

\(^b\)No histology.


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**TABLE 1**

Histological characteristics according to the ultrasound findings.
without kissing ovaries on ultrasound (25/27 [92.6%] vs. 99/282 [35.1%]; P < .0001).

The laparoscopic tubal patency test was performed in 145 infertile patients. Of these, five cases had kissing ovaries, 107 patients had pelvic endometriosis; and the remaining 33 patients had nonendometriotic adnexal masses. A higher proportion of cases with complete obstruction of both fallopian tubes was found among patients with kissing ovaries than among those without kissing ovaries (4/5 [80%] vs. 12/140 [8.6%]; P < .001). This figure did not change when the analysis was restricted only to patients with endometriosis (4/5 [80%] vs. 11/107 [10.3%]; P < .001).

In all five cases diagnosed to have kissing ovaries and not affected by endometriosis, dense adhesions were present between the ovaries, requiring lysis at the time of operation.

**DISCUSSION**

The present study shows that the detection of kissing ovaries at ultrasound is strongly associated with the presence of endometriosis and in particular is a marker of the most severe form of the disease. Indeed, in all cases an important adhesion formation between the ovaries and the surrounding pelvic organs and structures (e.g., with the sacrouterine ligaments, rectum, posterior uterine wall) was present.

The development of kissing ovaries is probably mimicking the processes induced in pelvic inflammatory disease. Although the etiology of endometriosis still remains an enigma, most investigators agree that the persistence and progression of ectopic endometrial tissue is intimately connected with a local pelvic inflammatory process (13, 14). Thus, it has been demonstrated that women with endometriosis have higher concentrations of proinflammatory cytokines in their peritoneal fluid than women without endometriosis (15–17). The peritoneal fluid accumulates in the dependent portions of the pelvis (18), especially in the pouch of Douglas, and the inflammation triggered by the endometriosis induces adhesion formation between the adjacent peritoneal surfaces and organs (19), displacing the ovaries medially and caudally into the Douglas.

Previous studies (1–3) that explored the predictive ability of ultrasound in identifying women with endometriosis showed an optimal agreement between ultrasound and intraoperative diagnosis only for ovarian endometriomas. The lack of a noninvasive tool to predict anatomic locations and extension of the disease in the absence of definite endometriomas has deeply limited the preoperative assessment. Our findings are in keeping with those of Exacoustos et al. (20), who found a high correlation between ultrasound and surgical findings. In particular, these investigators reported an 82% agreement between ultrasound and intraoperative evaluation in cases of severe endometriosis. According to our results, when ultrasound reveals the presence of kissing ovaries, the surgeon

### TABLE 2

**Grade and disease location in patients with pelvic endometriosis.**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Absence of kissing ovaries (n = 282)</th>
<th>Presence of kissing ovaries (n = 27)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of the disease&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal</td>
<td>48 (17)</td>
<td>0</td>
<td>.01</td>
</tr>
<tr>
<td>Mild</td>
<td>72 (25.5)</td>
<td>0</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate</td>
<td>91 (32.3)</td>
<td>3 (11.1)</td>
<td>.02</td>
</tr>
<tr>
<td>Severe</td>
<td>71 (25.2)</td>
<td>24 (88.9)</td>
<td>.0001</td>
</tr>
<tr>
<td>Location of ovarian endometriomas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unilateral endometrioma</td>
<td>117 (41.5)</td>
<td>9 (33.3)</td>
<td>.54</td>
</tr>
<tr>
<td>Bilateral endometriomas</td>
<td>32 (11.3)</td>
<td>13 (48.1)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Absence of endometriomas</td>
<td>133 (47.2)</td>
<td>5 (18.6)</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Fallopian tube involvement</td>
<td>93 (33.0)</td>
<td>25 (92.6)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Completely obliterated cul-de-sac</td>
<td>62 (22.0)</td>
<td>17 (63.0)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Mono-/bilateral ureteral endometriosis</td>
<td>9 (3.2)</td>
<td>5 (18.5)</td>
<td>.05</td>
</tr>
<tr>
<td>Uterosacral ligaments endometriosis</td>
<td>59 (20.9)</td>
<td>19 (70.4)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Bladder endometriosis</td>
<td>9 (3.2)</td>
<td>1 (3.7)</td>
<td>.60</td>
</tr>
<tr>
<td>Bowel endometriosis</td>
<td>7 (2.5)</td>
<td>5 (18.5)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Diameter of endometriomas (cm)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5 (2–10)</td>
<td>5 (2–9)</td>
<td>.30</td>
</tr>
</tbody>
</table>

**Note:** Data are presented as number (%) or median (range).

<sup>a</sup>According to the revised American Fertility Society classification.

<sup>b</sup>Considering the 191 patients with definite endometriomas.

should expect to find a tangled pelvis with subverted anatomy. Of interest, the proportion of bowel involvement in patients with kissing ovaries was statistically higher than in other women with endometriosis. This observation has important clinical value for the preoperative counseling and when deciding on appropriate surgical management. Chapron et al. (21), in their retrospective series of patients with deep infiltrating endometriosis, showed that laparotomy was still the procedure of choice in 23 out of 241 cases, particularly those with intestinal involvement. Redwine and Wright (22) reported that in the presence of complete cul-de-sac obliteration, aggressive laparoscopic excision of endometriosis is often required, including major intestinal surgery. Therefore, it is of the utmost importance to inform patients preoperatively of the ultrasound diagnosis of kissing ovaries and of the fact that some degree of intestinal surgery and eventually laparotomy could be required to achieve complete removal of endometriosis.

Another interesting observation of the present study is that the preoperative detection of kissing ovaries seems to be a negative prognostic marker for fertility. Although the high proportion of patients with nonpatent fallopian tubes and kissing ovaries found in the present study has to be taken with caution because of the small number of cases considered, it is very likely that, in the presence of kissing ovaries, the fallopian tubes are deeply involved in dense adhesions and are nonpatent.

Moreover, infertile patients with kissing ovaries are likely to have the most severe form of endometriosis, which, in turn, is associated with lower pregnancy rates. Several reports suggest that the peritoneal microenvironment of patients with severe endometriosis could negatively affect the response to ovarian stimulation, fertilization, and implantation rates, impairing even assisted reproductive technology outcome (23, 24).

In conclusion, the finding of kissing ovaries at ultrasound is suggestive of severe pelvic endometriosis, a condition often affecting the menstrual cycle and sexual activity, compromising quality of life and fertility. The preoperative identification of kissing ovaries at ultrasound should be considered an indication for referring the patient to a qualified endometriosis center to optimize the surgical treatment in terms of radicality, fertility preservation, and risk of recurrence.

REFERENCES