

**The impact of laparoscopic  
cystectomy on ovarian  
reserve in  
patients with unilateral and  
bilateral endometriomas**

- Endometriosis refers to the presence
- of endometrial glands and
- stroma outside of the uterine
- cavity.

- often presenting with pelvic
- pain and infertility.
- Endometrioma in 17%–44% of patients
- with endometriosis

- **Treatment**
- **is still a challenging**
- **issue. Because it is encountered most**
- **frequently in reproductive aged**
- **women, preservation of reproductive**
- **function is the main goal.**

- the least invasive and the least expensive approach that will restore
- normal anatomy, reduce pain, prevent
- recurrence, and increase pregnancy
- rate should be implemented

- Patients with endometriomas
- or pelvic adhesion, as well as
- infertility would not benefit from
- medical therapy.
- laparoscopic ovarian
- cystectomy appears to be the method
- of choice.

- Ovarian reserve refers to the functional potential of the
- ovary, reflected as the number and quality of the remaining
- primordial follicles at any given time.

- no tests or markers have as yet
- been shown to be ideal. Static tests include age, FSH, LH, E2,
- FSH:LH ratio, AMH, inhibin B, and
- sonographic variables such as ovarian volume, antral follicle
- count (AFC), and stromal blood flow.

- Recently, AMH has been suggested as the most reliable and
- reproducible marker, because it is menstrual cycle
- independent and unaffected by the use of hormonal drugs.

- In the present study, levels
- of AMH, FSH, E2, and AFC, were measured before and after
- laparoscopic cystectomy of endometriomas to determine the
- ovarian reserve modifications after this operation.

- also
- evaluated effects of age, size of the cyst, bilaterality, multiplicity,
- and histopathologic grade on the ovarian reserve after
- laparoscopic excision.

- In this prospective study, 193 patients with endometriomas,
- who underwent laparoscopic
- ovarian cystectomy in 2 years were
- studied.

- Included were 18–43-year-old women
- with regular menses, unilateral or bilateral, single or multiple
- endometriomas, presenting with pelvic pain or infertility.

- Exclusion criteria were: [1] previous adnexal surgery, [2] hormone therapy (HT) or oral contraception (OC) for the past three cycles, [3] other endocrine diseases such as thyroid disease, hyperprolactinemia, diabetes mellitus, or adrenal disorders, [4] suspected or proven ovarian malignancy, and [5] evidence of premature ovarian failure (POF) or premature menopause.

- All the patients were examined physically and underwent transvaginal ultrasonography
- preoperatively to determine the size of the endometrioma
- as well as its location, multiplicity, and bilaterality.

- The
- patients were divided into four groups according to age (<38 or >38 years of age), size of the cyst (>3 cm,< 3 cm), bilaterality
- (bilateral or unilateral), and multiplicity (single unilateral,
- single bilateral, multiple unilateral, multiple bilateral)
- of endometriomas. The latter three groups were compared after
- exclusion of patients more than 38 years of age.

- Before the operation, AMH, FSH, and E2 were measured.
- All of the hormonal measurements were performed at the third or fourth day of
- the menstrual cycle.

- Each patient visited the clinic
- 1 week, 3 and 9 months postoperatively and serum levels of
- AMH were measured at that time. Serum levels of FSH and
- E2 were measured preoperatively and 3 months postoperatively.

- Ultrasonographic examination for evaluation of endometrioma
- and AFC (the total number of 2- to 10-mm antral
- follicles in both ovaries) was performed with a transvaginal sonography
- by the same gynecologist
- preoperatively and 3 months postoperatively on the
- third or fourth day of the menstrual cycle.

- In total we included 193 patients, 72 (37.3%) had bilateral and 121
- (62.7%) had unilateral endometriomas. Deep infiltrative
- endometriosis was reported in 183 patients (94.8%).

- The serum levels of AMH decreased significantly 1 week
- , 3 months, and 9 months postoperatively.

- The AMH level increased significantly from 1
- week to 3 months after operation, but remained
- approximately unchanged until month 9. The
- serum levels of FSH increased significantly 3 months
- after the operation. Although the AFC increased
- significantly 3 months after the operation, the
- serum level of E2 remained unchanged.

- Patients older than 38 years had significantly
- lower baseline serum level of AMH when compared with those
- younger than 38 years. Similar trend of decline in AMH was recorded in
- those older than 38 and younger than 38 years. However,
- older patients had significantly lower AMH levels 1
- week, 3 months, and 9 months after the operation.

- There was no significant difference between those with
- large and small cysts (3 cm as a cutoff value) regarding the
- baseline level of AMH. The trend of decrease in AMH after the
- operation was similar between these two study groups.
- there was no significant difference
- regarding AMH level between those with large and small cysts
- 1 week, 3 months, and 9 months
- after the operation.

- There were 72 patients (37.3%) with bilateral and 121 patients
- (62.7%) with unilateral endometriomas. The baseline
- AMH level was comparable between these two groups . The AMH
- level decreased significantly 9 months after the operation in
- those with unilateral and bilateral cysts.
- We found that those with bilateral cysts who underwent
- laparoscopic cystectomy had significantly lower levels
- of AMH 1 week , 3 months, and 9 months
- after the operation .

- Those with single unilateral cysts had significantly higher
- baseline levels of AMH when compared with those with single
- bilateral cysts. the baseline serum levels of
- AMH was higher in those with multiple bilateral cysts
- compared with those with single bilateral ones.
- The trend of changes of AMH levels after the operation was
- similar in all groups except for those with multiple unilateral
- cysts in whom the AMH level did not decreased significantly.

- Patients with single unilateral cysts had
- significantly lower levels of AMH 1 week and 3
- months after the operation. The serum levels of
- AMH 9 months after the operation was comparable between
- all groups.

- At present, laparoscopic ovarian cystectomy for endometriomas
- has been declared the treatment of choice, with
- the reported benefits of a decrease in the recurrence of sign and symptoms and reoperation risk, increase in responsiveness
- to ovarian stimulation, and cumulative PR in randomized
- controlled trials.

- **Because of different patients'**
- **complaints and the risk of decrease in ovarian reserve after**
- **laparoscopic cystectomy, the researchers are investigating**
- **new techniques to reach the individual's treatment goals**
- **with the least adverse effect on the healthy ovarian tissue.**

- This study has been conducted on patients with
- endometriomas undergoing laparoscopic cystectomy to
- assess the effects of the surgery on ovarian reserve
- Markers and found a significant decline in serum AMH
- level from baseline to 1 week, and 3 and 9 months
- postoperatively.

- findings suggest that the decrease in the serum AMH levels caused by cystectomy can recover.

- results suggest that
- removal of the ovarian cortex might be involved in the
- decrease of the ovarian reserve just after surgery, and that
- a continuous decrease of the ovarian reserve after
- cystectomy might be attributed to other mechanisms.

- A
- lower serum AMH level 1 week postoperatively would be
- expected due to inflammation, edema, vascular injury, and
- ischemia. the significant increase in serum
- AMH level 3 months after surgery could be explained by a
- good healing process and reperfusion of the operated
- ovaries. But we detected no significant increase in level
- from 3–9 months after the operation, which could be
- explained by the removal of antral follicles that may not
- be recovered in 9 months.

- In addition the increasing age,
- as the independent risk factor for decreasing the ovarian
- reserve, could be responsible for decreased levels of AMH 9
- months after the operation. performed a review to determine the role of different surgical
- techniques for endometriosis on ovarian reserve.

- repeated surgeries are associated with a severe
- decrease in ovarian reserve.
- considerable surgical expertise is required to maintain the
- ovarian reserve in endometrioma surgery.

- no correlation between the histopathologic grade of follicular loss and
- decrease in ovarian reserve .

- According to age (<38 years, >38 years), the baseline
- serum AMH level was lower in older patients. It did not reach
- a statistically significant level, it continued to decline and
- reached a clinically significant low level after 3 months. These changes were not statistically
- significant in older patients

- . Apparently, the lower baseline
- level and the persistent decline of AMH level in older patients
- cannot be ignored, specifically when the main goal is preservation
- of future fertility, which would certainly affect the
- selection of the best therapeutic approach, alternative options,
- and timing of assisted reproductive technology (ART).

- Comparison of two different cyst sizes (<3 cm, >3 cm) revealed
- that there was no significant difference in the baseline
- AMH level. The patients with smaller cysts demonstrated a
- smaller increase in AMH level from 1–12 weeks after the operation
- compared with those patients with larger endometriomas.

- This could be explained by the greater technical difficulty in
- stripping smaller endometriomas, which induces more ovarian
- tissue damage and follicular loss, in addition to vascular
- compromise and inflammation.

- regardless of
- the size of the endometrioma, ovarian stripping is associated
- with a significant decrease in residual ovarian volume, which
- may result in diminished ovarian reserve and function

- Patients with bilateral endometriomas had a lower baseline
- AMH level compared with unilateral cysts, which remained
- lower at the end of the follow-up period, although no statistically
- significant difference was found. there was
- no significant increase from the immediate time after surgery
- to the last measurement at follow-up for bilateral cysts. There
- is no consistent report on the effect of bilaterality on the AMH
- level.

- It should also be kept in mind that the endometrioma
- itself can affect the ovarian reserve negatively.

- showed that in women with advanced ovarian endometrioma,
- preoperative serum AMH values tend to be lower
- than those for age and body mass index (BMI)-matched controls.
- Notably, stage IV endometriosis appeared to be closely
- associated with decreased ovarian reserve, even before operation.

- These results suggest that even before the operation the ovarian reserve could be minimal secondary to advanced
- endometriosis.

- Considering the proposed mechanisms of damage, a more
- deleterious effect on ovarian reserve would be expected by
- bilateral stripping of the endometriotic cysts as shown in
- our study. this study reports a significant decline in AMH
- level in individuals with multiple bilateral endometriomas
- compared with single and multiple unilateral ones, thus representing
- bilaterality and multiplicity as more damaging factors.

- there was a
- significant increase in serum FSH level in all patients. In
- addition, the difference between age groups comparing the
- baseline and 3 month postoperative levels was remarkable.

- Although there were only eight patients older than 38 years,
- the increase reached changes in serum
- AMH levels in different age (A),
- size (B), bilatrality (C) and number (D) groups after 3
- months, the highest level among all the groups. There were
- also significant increases in the FSH levels for bilateral and
- larger endometriomas. baseline serum E2 level
- was significantly lower in older patients and those with
- bilateral endometriomas.

- Ultrasonographic AFC has been adopted as the most
- reliable marker of ovarian reserve besides AMH. Surprisingly,
- reported data on changes in AFC after laparoscopic
- cystectomy of endometriomas has been conflicting and are
- not in line with the changes in the serum AMH level. We
- observed a significant increase in AFC 3 months after surgery.

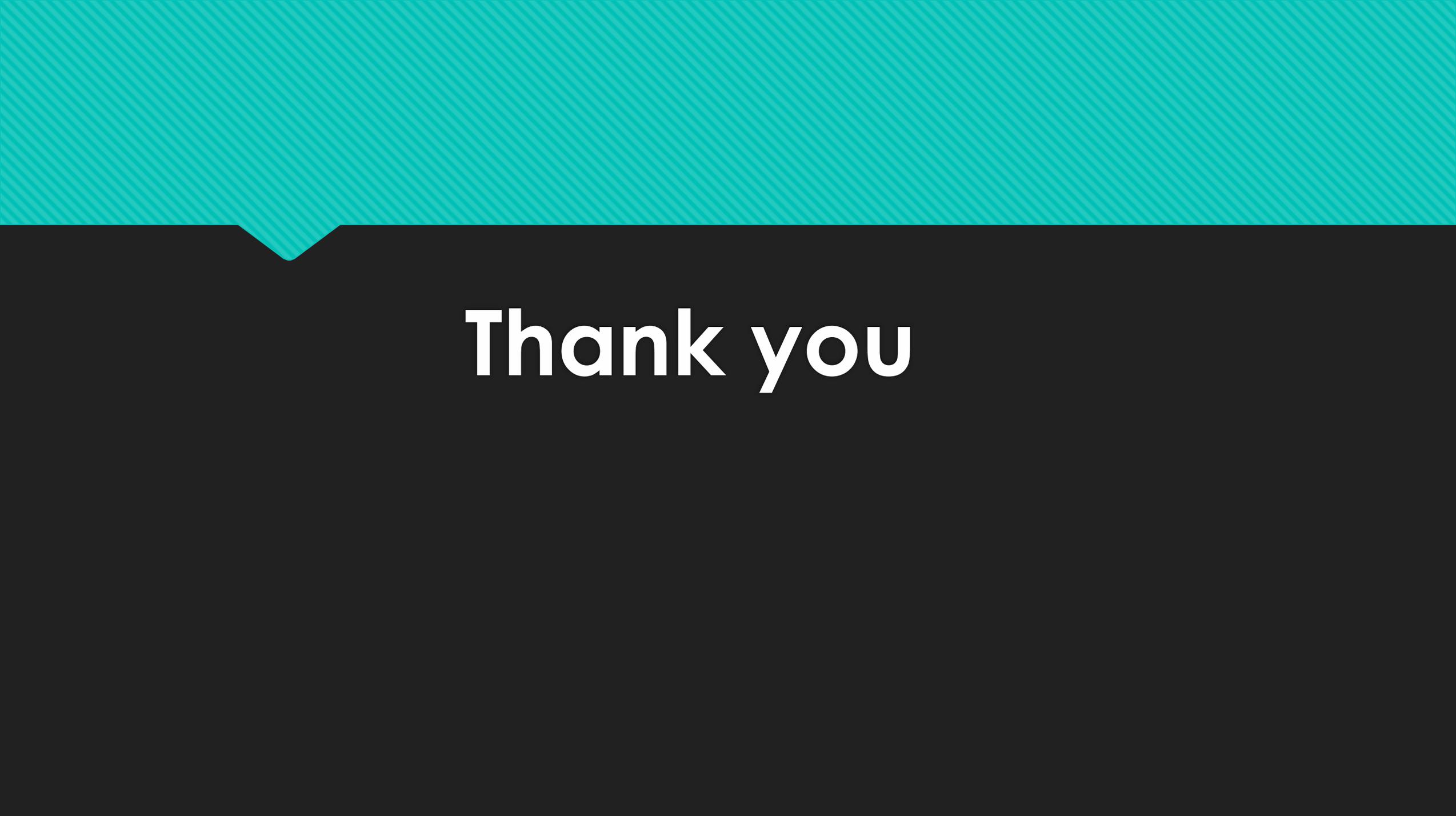
- Some investigators have tried to evaluate the effect of
- various techniques and to innovate other surgical procedures
- with less possible damage to healthy ovarian tissue, thereby
- achieving therapeutic goals more efficiently.

- serum level of AMH decreased after laparoscopic
- cystectomy in patients with endometrioma. This
- persistent pattern was observed in all groups of patients
- according to age, cyst size, bilaterality, and multiplicity
- with the clinically significant lower levels in patients older
- than 38 years.

- Together with an increase in FSH and lower
- baseline E2 level, these patients deserve the most precise
- preoperative evaluation to preserve their ovarian function,
- especially when they are attempting to get pregnant.

- . Also,
- those subjects with smaller endometriomas and bilateral
- cysts, especially multiple bilateral ones, should be appropriately
- counseled before surgery and all the risks and benefits
- of treating the disease and the impact on their ovarian
- functional potential are suggested to be discussed and
- individualized.

- According to the inconsistent reports on
- AFC, this ovarian reserve marker may not be reliable in
- clinical practice to address ovarian reserve after the laparoscopic
- stripping technique.

The image features a teal top section with a fine, repeating pattern of diagonal lines. Below this is a solid black section. A white, speech-bubble-like shape is cut out from the black area, pointing downwards. The text "Thank you" is centered within this white shape in a bold, white, sans-serif font.

**Thank you**