Ovarian reserve in women with endometriotic cysts: where to draw the line

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Endometriomas are defined as the cystic manifestation of ovarian endometriosis, though its pathogenesis still remains enigmatic. Ovarian reserve is defined as the number and quality of the follicles in the ovary at any given time. Therefore, the impact of the disease *per se* and, also, of the preferred surgical approach is of utmost importance in cases of endometriosis-associated infertility. Several clinical tests have been used in order to determine the ovarian reserve, which include hormonal, ultrasonographic and histological methods. Sonographic assessment of the antral follicle count (AFC) has been strongly associated with the primordial follicle pool and is used as a reliable sonographic indicator of ovarian reserve. Anti-Mullerian hormone (AMH), which is produced by the granulosa cells of the recruited preantral and early antral follicles has got popularity to predict ovarian reserve.

Endometriomas *per se* have a negative impact on the ovarian reserve, since the ovarian cortex surrounding the cyst is reduced. It has been clearly shown that the presence of ovarian endometriomas is associated with a reduced responsiveness to gonadotropins (Somiglian et al., Fertil. Steril. 86: 192-196, 2006) and reduced number of oocytes in IVF cycles (Opoien et al., Fertil. Steril., 92: 912-918, 2012). On the other hand, the surgical approach itself has a negative impact on ovarian reserve due to unintended removal of attached health tissue, thermal damage, alteration of ovarian artery blood flow and subsequent folliculogenesis. Among several conservative laparoscopic methods for surgical management of endometriotic cysts, laparoscopic cystectomy seems to be the preferred surgical approach in terms of recurrence and pain relief. It has been clearly shown by others, as well by us (Pados et al., Hum Reprod., 25(3), 672-677, 2010; Pados et al., Fertil. Steril., 94(1), 71-77, 2010) that cystectomy has a negative impact on ovarian reserve compared with the "three-stage" technique.

So, the critical point in case that one chooses cystectomy as the preferred surgical approach is to precisely apply the 4 steps of cyst excision (opening of the cyst at the inversion stigma, accurate dissection, minimal use of electrocautery for hemostasis and loose re-approximation of the edges with suture, electrocuagulation or CO2 laser). Also, parameters as previous interventions for endometriotic cysts, bilateral location, fast increase and reduced ovarian reserve should also be taken into account.

In conclusion, the treatment of ovarian endometriomas should be individualized taken into consideration not only relief of symptoms, pregnancy rates or recurrence, but, also, the ovarian function and ovarian reserve after surgery.