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Impact on ovarian reserve (AMH) in women of childbearing potential with endometrioma undergoing ovarian sclerotherapy versus laparoscopic cystectomy

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ABSTRACT

Endometriosis is a pathology that has a great impact on patients with fertility problems and its management continues to be highly debated, there are different types of treatment (observation, medical or surgical treatment and assisted reproduction techniques). A systematic review with meta-analysis of the 10-year-old literature related to sclerotherapy of ovarian endometrioma, laparoscopic cystectomy of ovarian endometrioma, anti-Müllerian hormone and ovarian reserve is carried out. We are left with 5 studies that evaluate the values of anti-Müllerian hormone before and after intervention, finding a low heterogeneity index when evaluating the 5 articles with RevMan 5.0.0. But their results are not statistically significant. We worked with 170 and 186 events (sclerotherapy and laparoscopic cystectomy, respectively). In this study, no statistically significant differences were found between the two procedures in terms of the impact on the ovarian reserve (anti-Müllerian hormone). However, it should be noted that of the 5 articles, only 3 of them had a lower impact on the values of anti-Müllerian hormone in relation to ovarian sclerotherapy. It is concluded that ovarian sclerotherapy is a very good alternative for endometrioma management without major impact on the ovarian reserve.

KEYWORDS: ovarian endometrioma sclerotherapy, laparoscopic ovarian endometrioma cystectomy, anti-Müllerian hormone and ovarian reserve.

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INTRODUCTION

Ovarian endometrioma is a manifestation of endometriosis that commonly presents as an ovarian cyst, and has been associated with a reduction in ovarian functional reserve due to oxidative stress, local inflammation, and loss of surrounding healthy ovarian tissue[1,2]. Anti-Müllerian hormone (AMH) is an accepted marker for quantifying ovarian ovarian reserve and is useful in postoperative follow-up[3]. Laparoscopic cystectomy is the standard intervention to treat endometriomas, but multiple studies have shown a significant decrease in AMH after surgery, both in the short and long term. In a recent meta-analysis that included 30 studies, a mean decrease in AMH of –1.39 ng/mL in the short term, –1.13 ng/mL in the medium term, and –2.12 ng/mL in the long term (up to 18 months) was observed, all statistically significant ($p < 0.001$) [4]. A previous systematic study documented an average drop of 1.77 ng/mL (–44%) at 1-6 weeks, and up to 2.13 ng/mL (–54%) at 9-18 months after surgery [5]. As a more conservative alternative, ovarian sclerotherapy (e.g., with 95% ethanol) has been explored to better preserve the ovarian reserve (AMH). An observational study showed that AMH levels decreased from 3.4 ng/mL (SD 2.3) to 2.0 ng/mL (SD 1.7) after sclerotherapy, with a mean difference of 1.29 ng/mL ($p < 0.001$), and a spontaneous pregnancy rate of 40% after a median follow-up of 17.5 months [6]. A comparative multicenter pilot study found that AMH and FSH did not change significantly before versus after treatment with aspiration plus sclerotherapy versus cystectomy, and that antral follicle count (AFC) appeared to recover better after sclerotherapy[7]. A recent systematic review and meta-analysis, which included 28 studies and 1,877 patients, concluded that sclerotherapy preserves ovarian reserve significantly better (less change in AMH), in addition to exhibiting better results in in vitro fertilization (higher number of total oocytes, MII, embryos, and clinical gestation rates), with no differences in fertilization or gonadotrophin doses [8]. Despite this evidence, a meta-analysis has not been published so far that directly compares the impact on AMH between sclerotherapy and laparoscopic cystectomy in women of childbearing age with endometrioma, quantitatively integrating the effects of both techniques. Therefore, the aim of this systematic review and meta-analysis is to evaluate the impact of ovarian sclerotherapy versus laparoscopic cystectomy on ovarian reserve (as measured by AMH) in women of childbearing potential with endometrioma.

MATERIAL AND METHOD

The study was exempt from approval by the Institutional Review Committees because it was a systematic review and meta-analysis.

Search strategy

An exhaustive electronic search was carried out in the following databases (up to 10 years ago from February 2025): PudMed and google scholar. The search combined terms and descriptors related to ovarian endometrioma sclerotherapy, laparoscopic ovarian endometrioma cystectomy, anti-Müllerian hormone, and ovarian reserve. The search strategy was modified to adapt to the syntax used in each database consulted.

Eligibility Criteria

- Experimental or quasi-experimental studies are included in this study
- Studies that have an impact on the ovarian reserve evaluated with anti-Müllerian hormone values, pre- and post-cystectomy and/or sclerotherapy are included
- Studies in women of childbearing age.
- Women with ovarian endometrioma who will undergo sclerotherapy or laparoscopic cystectomy are included.
- Studies published from 2015 to the present are evaluated.
- The methodological quality of the studies is assessed

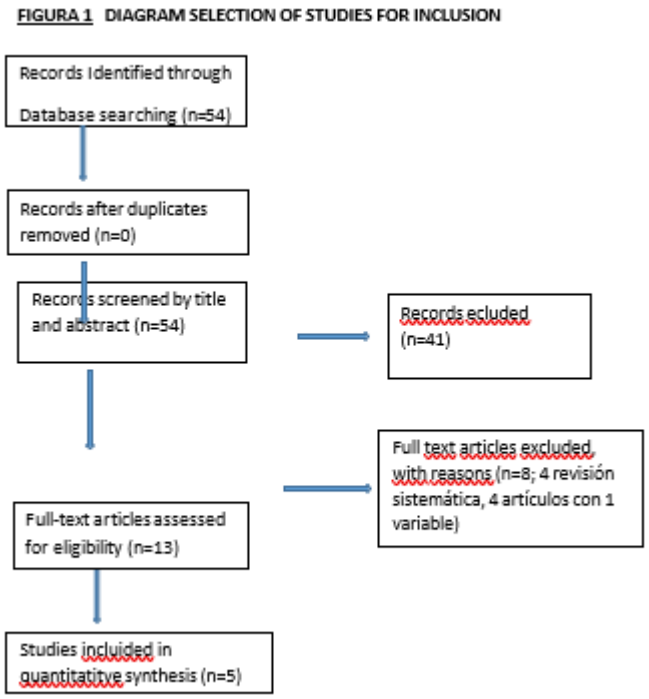

Figure 1.

Data extraction and analysis

Selection of studies:

Using the proposed search strategy, studies that met the inclusion criteria were included. (Figure 1)

Data extraction

An exel template was used to extract the data of interest from each of the studies that were eligible (Table 1)

Assessment of study bias

We assessed the publication bias of each study using The Newcastle-Ottawa Scale (NOS).

Measuring the effect of treatments

An analysis of aggregate data from the 5 studies was performed, where the difference in the means obtained in each study was analyzed to evaluate the effect on anti-müllerian hormone according to each intervention, using the fixed-effect model and we used the forest plot graphs to show the results of several studies in a single image (Sos, 2020).

Unit of study

Study heterogeneity was analysed using RevMan 5.0.0 software (Review Manager)

RESULTS

Search Results

In the initial search of Pud Med, we found 54 results; Staying at the end, when reviewing the titles and abstract only with those

that were original articles, as well as those that had 1 or both procedures in mention, and the values of the anti-Müllerian hormone (13), we then went on to review the content of these articles, keeping only the 5 that met the inclusion and exclusion criteria; It is also worth mentioning that when the respective filter was made, 04 articles were found that were systematic review, 0 meta-analysis, and 4 trials in which both variables of our study were not taken into account, so they were excluded.
Data extraction and analysis of included studies

Selection and description of studies
They are shown in Table 1 and Table 2

Bias assessment of included studies
The bias of the 5 studies was assessed using the NOS scale as shown in Table 3.
Effect of interventions

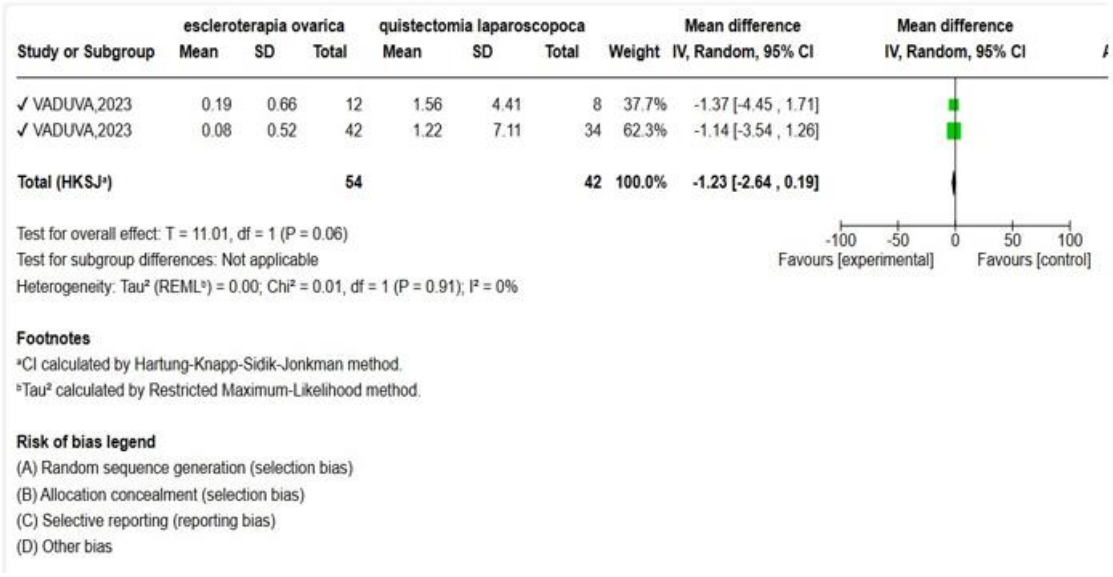

Figure 2: influence on the ovarian reserve (anti-Müllerian hormone) of sclerotherapy vs cystectomy three months after surgery

The impact on ovarian reserve (Anti-Müllerian Hormone) was evaluated in a study that took 2 populations (20-29 and 30-39 years) at 3 months after sclerotherapy or laparoscopic cystectomy, showing a low significance (-1.23, 95% CI (-2.64, 0.19)). (fig.2)

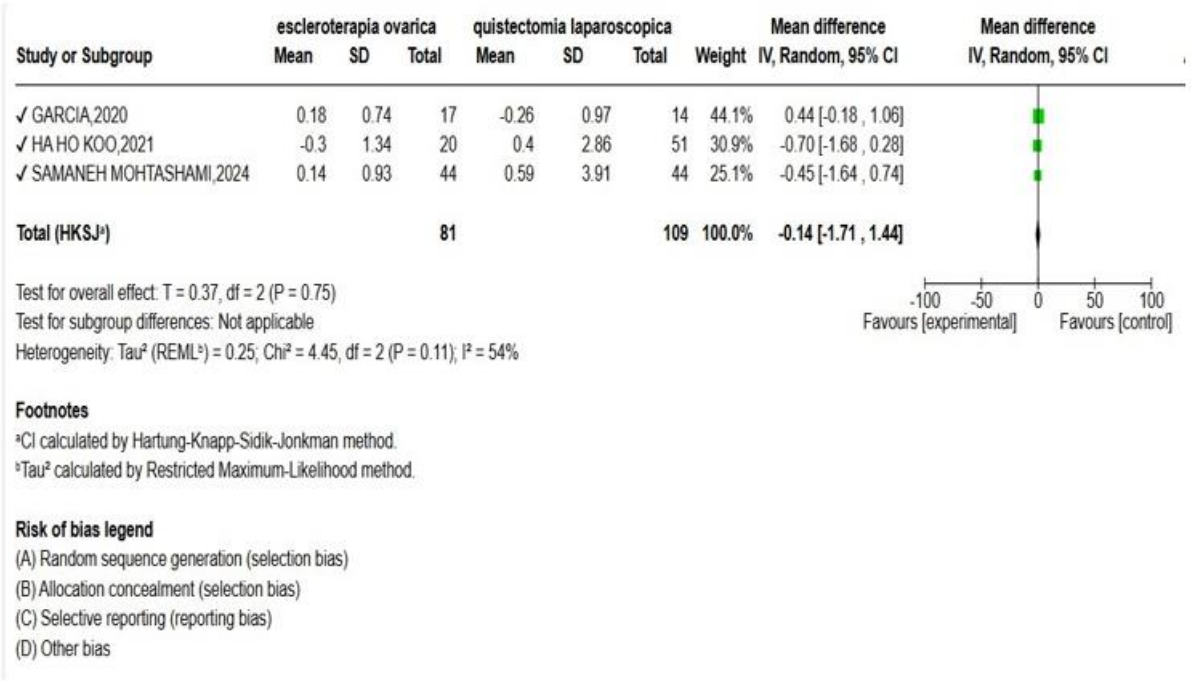

FIGURE 3: Influence on ovarian reserve (anti-Müllerian hormone) of sclerotherapy vs. cystectomy at six months post-intervention

The impact on ovarian reserve (AMH) was evaluated in three studies with 81 patients undergoing sclerotherapy and 109 patients undergoing cystectomy, 6 months post-intervention, showing a low significance (-0.14, 95% CI (-1.71, 1.44). (Fig. 3)

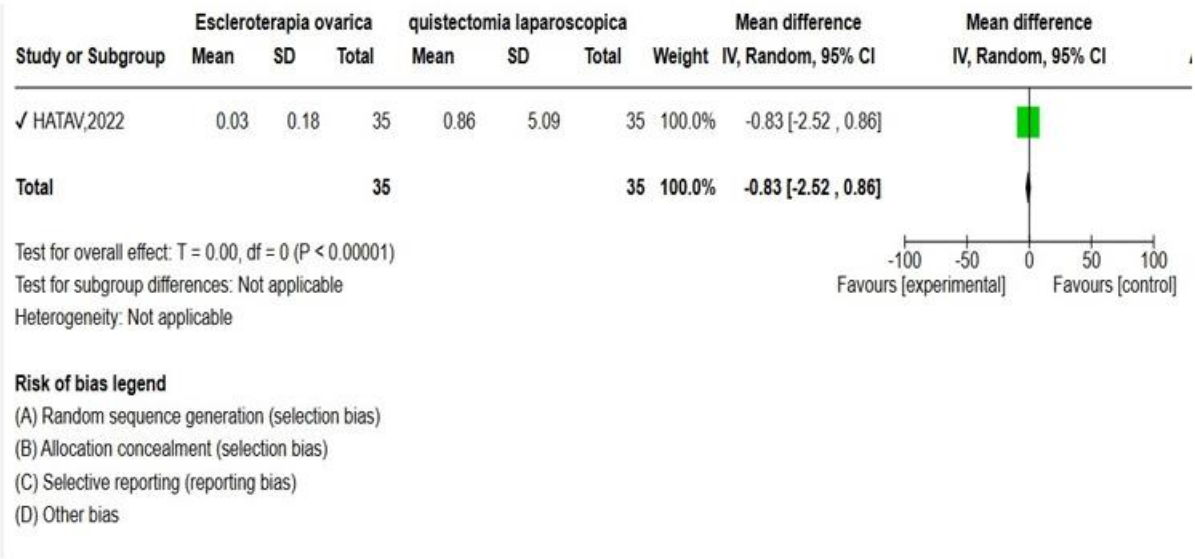

FIGURE 4: Influence on ovarian reserve (anti-Müllerian hormone) of sclerotherapy vs. cystectomy at twelve months post-intervention

The impact on ovarian reserve (Anti-Müllerian Hormone) was evaluated in a study with 35 patients undergoing sclerotherapy and 35 undergoing cystectomy, 12 months after intervention, showing low significance (-0.83, 95% CI (-2.62, 0.86)). (fig.4).

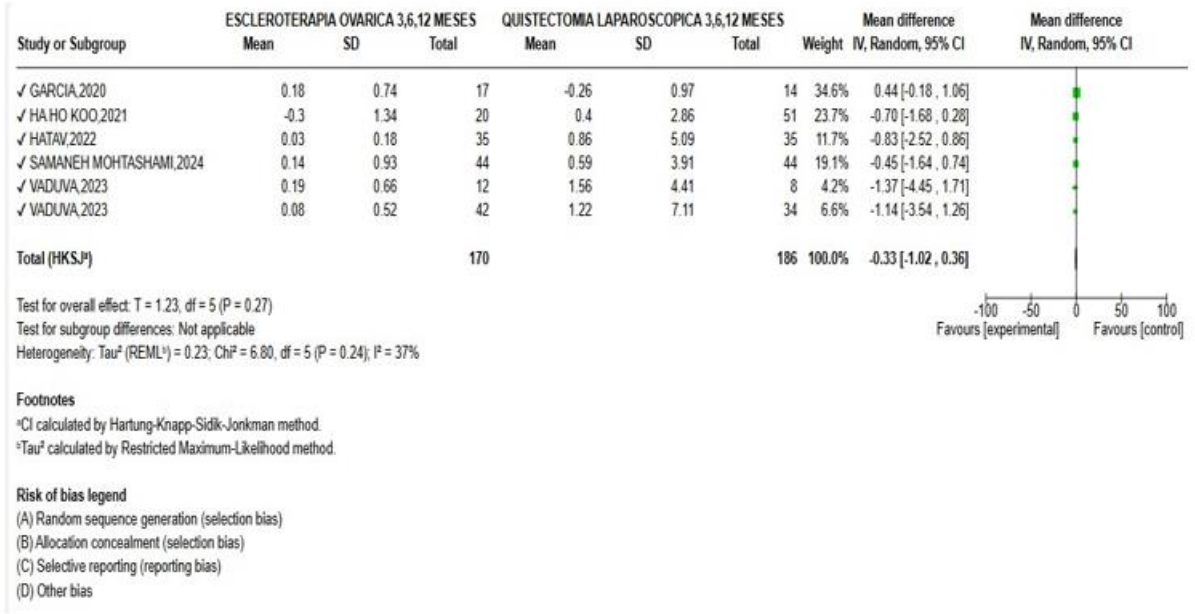

FIGURE 5: Influence on ovarian reserve (Anti-Müllerian hormone) of sclerotherapy vs. cystectomy at 3, 6 and 12 months post-intervention

The impact on ovarian reserve (anti-Müllerian hormone) was evaluated in 5 studies with a total of 170 patients undergoing sclerotherapy and 186 undergoing cystectomy, post-intervention (3, 6 and 12 months), showing low significance (-0.33, 95% CI (-1.02, 0.36)). (fig.5).

DISCUSSIONS

The study found no statistically significant differences in ovarian reserve values when performing cystectomy or sclerotherapy. But, in this work it can be evidenced that the comparative studies between both procedures show a lower impact with respect to the ovarian sclerotherapy procedure in terms of less effect on the ovarian reserve (Anti-Müllerian hormone) finding of the 5 articles that 3, that of Ha Ha koo, Hatav-Tehrani and Samaneh-Mohtashami, evidence of the above. In addition, there are other

studies where the ovarian reserve is evaluated with the number of antral follicles in which they conclude that a surgical resection compared to ovarian sclerotherapy showed a greater involvement of the ovarian reserve (Lee, 2014), results similar to those mentioned above.

It is worth mentioning that although ovarian sclerotherapy apparently tends to affect ovarian reserve less (Han, 2018, Huang, 2021); however, the disadvantage is that in most of the studies evaluated, it was associated with a higher recurrence of the endometrioma over time, unlike laparoscopic ovarian cystectomy, which was associated with a lower recurrence rate (Anh, 2022; Li CZ, 2013; Song, 2014; Biacchiardi, 2011).

It seems to indicate that ovarian sclerotherapy is a very good alternative for endometrioma management prior to infertility treatment. Future prospective work is required.

Few studies comparing both techniques were found and the published studies are mostly observational and cohort studies, with a small sample size, so it is suggested to carry out larger studies with a larger population.

It is worth mentioning that in this study there was a total sample number, 170 and 186 events (sclerotherapy and laparoscopic cystectomy respectively) is small, which could indicate a deficit of the sample, we must also take into account that the ranges in which the anti-Müllerian hormone varies after each intervention, being very small, has an impact on the sample size to find significant results. implying that the sample should be much larger

Different variables such as different surgical techniques, different sclerotherapy techniques, different hospitals, different laboratories in which the samples were analysed also influence the results, which implies that the studies are very heterogeneous. Although there is a lack of studies, we can differentiate that in different individual studies, sclerotherapy is shown to be a good alternative for the management of ovarian endometrioma and its symptoms, without affecting the ovarian reserve, which is extremely important for any patient who needs any fertility treatment afterwards.

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