

## Chapter 5

### Concluding remarks



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved

Pelvic endometriosis is a common gynecological condition. Its management remains controversial and often poses a therapeutic dilemma for clinicians. The treatment should be individualized according to the needs of each patient.<sup>(1-5)</sup> The American Society for Reproductive Medicine Committee classifies endometriosis as a chronic medical illness that requires a long-term management throughout a woman's reproductive life.<sup>(6-8)</sup> Conservative surgery, by the laparoscopic approach, is often the treatment of choice.<sup>(4)</sup> However, the impact of conservative surgery for endometrioma on ovarian reserve and subsequent clinical outcomes has recently been questioned.

A bunch of medical literatures, including systemic reviews and meta-analyses, demonstrated the adverse effect of laparoscopic ovarian cystectomy for endometrioma on ovarian reserve.<sup>(9-20)</sup> However, previous studies recruited patients with ovarian diseases, and none of them enrolled control patients without ovarian pathology, who underwent other gynecology surgery. In one of our studies, we hypothesized that the immediate decrease in AMH level after surgery could also be due to factors other than the injury to adjacent ovarian follicles during cyst wall stripping and removal. Blood loss during laparoscopic surgery or the effect of general anesthesia could also contribute to the decrease in antimullerian hormone (AMH) level. This could be demonstrated by including a group of controls, who underwent gynecologic operation without ovarian surgery. Hence, our study compared the change in AMH level after laparoscopic ovarian cystectomy for endometrioma versus a control group, who received non-ovarian pelvic surgery.

When comparing the serum AMH level in a group of patients after laparoscopic ovarian cystectomy (LOC), with another group, who had non-ovarian surgery (NOS), there was no statistically significant difference in AMH level between the two groups at 1 week, 1 month, and 3 months after surgery. However, there was a statistically significant difference between the two groups at 6<sup>th</sup> month postoperatively.<sup>(21)</sup> Our findings support the above hypothesis that the initial decrease in AMH level could be due to multiple factors besides the injury to ovarian follicles themselves. Our results were consistent with a study by Atabekolu *et al.*<sup>(22)</sup>, who reported a negative effect of total abdominal hysterectomy on serum AMH. They postulated that hysterectomy could reduce ovarian blood flow and resulted in a temporary decline in ovarian reserve. After three to six months of surgery, the level of AMH rebound because of re-vascularisation of the ovarian tissue. However, the true mechanism of ovarian reserve recovery needs to be investigated further in future studies.

There were some limitations to our study. Firstly, we measured ovarian reserve by the use of only a single hormonal marker. A combination of ovarian reserve testing or the use of other assays

with a higher sensitivity could provide a more accurate interpretation. However, a higher cost would be involved, and this should also be taken into consideration. Secondly, the operations in the NOS group were different in terms of surgical techniques, time involved, and the amount of blood loss. Thirdly, some participants dropped out (loss to follow-up) or became pregnant (censored), and were not included in the analysis.

The intra-operative hemostatic methods have been questioned to contribute adverse effect on ovarian reserve. The available evidence on this subject is few and inconsistent. Most studies were non-randomized, and had limited follow-up data of only few months after the surgery.<sup>(19, 23-25)</sup> The study in this thesis was a randomized controlled trial, comparing the AMH level in a group who received bipolar coagulation with another group who had suturing as the method of hemostasis during laparoscopic ovarian endometriotic cystectomy. Patients in both groups were followed for six months after surgery.<sup>(26)</sup> The decrease in AMH levels was not significantly different in both groups, and there was no rebound or recovery of AMH levels throughout the six months of follow up. In our study, we could not observe any difference between the two types of hemostatic methods. A major limitation in our study was the small sample size. We did not have enough statistical power to detect a small difference in AMH levels of 25% or less. Also, the surgeons knew the objective of the study, and there could be bias in minimizing the use of bipolar cauterization to stop the bleeding.

The recurrence of endometriosis after a conservative surgery constitutes a major problem, and creates difficulties for gynecologists in the management of their patients. The recurrence rate has been reported in many publications.<sup>(27)</sup> Some studies were conducted to explore the risk or determinants of recurrence of the disease.<sup>(28-34)</sup> However, the surgical approaches via the laparoscopy or laparotomy have been overlooked and not investigated. We conducted a retrospective cohort study to compare the time to recurrence of ovarian endometrioma after the laparoscopic and laparotomy approach. The propensity score was utilized to minimize the effects of confounders. A logistic regression with survival time model was also used for analysis of the recurrence rate. After adjusting for propensity scoring, the endometrioma recurrence rate was significantly higher in the laparoscopy than the laparotomy group. The result demonstrated that, in our unit, the surgical technique had a strong impact on the recurrence or disease-free interval. Laparoscopy might not eradicate the disease pathology as effectively as open laparotomy, especially in cases with extensive disease. However, there are some limitations in our study. The study was retrospective, and with this type of study design, medical records might contain incomplete

information. The follow up protocol of each gynecologist was also equivocal and uncertain. Also, our results might be applicable to other general gynecological units, but not specialized laparoscopic centers where surgeons were experts in advanced laparoscopic surgery. We are aware that the skill of surgeons is the one of the most important factor in the complete eradication of the disease. In the hands of an expert gynecological laparoscopic surgeon, surgical approach via the laparoscopy or laparotomy may not make a difference.



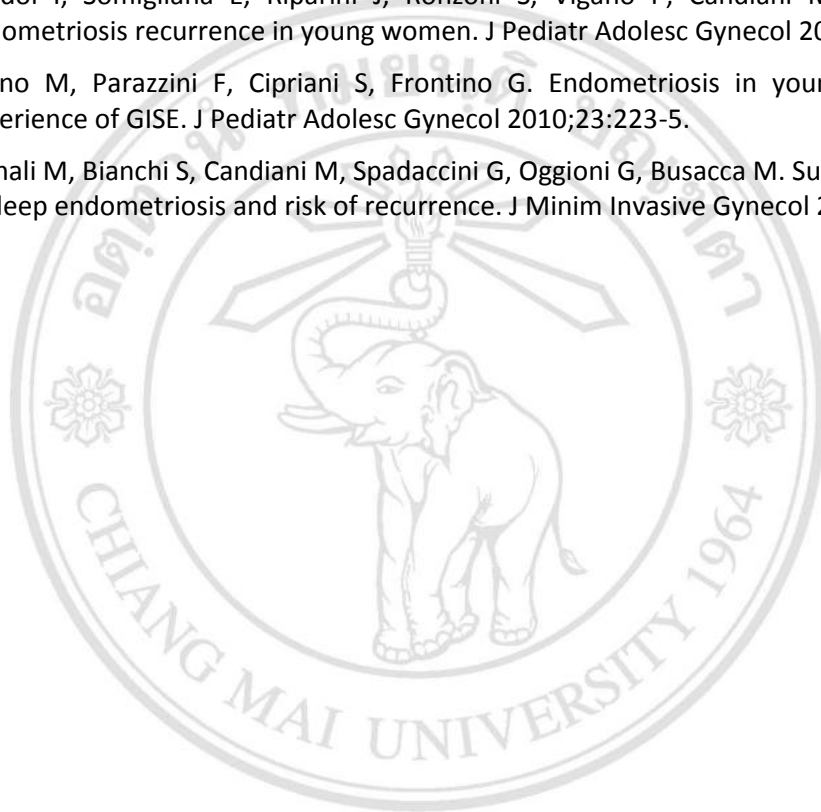
ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved

## References

1. Bulun SE. Endometriosis. *N Engl J Med* 2009;360:268-79.
2. Falcone T, Lebovic DI. Clinical management of endometriosis. *Obstet Gynecol* 2011;118:691-705.
3. Giudice LC. Clinical practice. Endometriosis. *N Engl J Med* 2010;362:2389-98.
4. Kodaman PH. Current strategies for endometriosis management. *Obstet Gyn Clin N Am* 2015;42:87-101.
5. Dunselman GA, Vermeulen N, Becker C, Calhaz-Jorge C, D'Hooghe T, De Bie B, et al. ESHRE guideline: management of women with endometriosis. *Hum Reprod* 2014;29:400-12.
6. Treatment of pelvic pain associated with endometriosis: a committee opinion. *Fertil Steril* 2014;101:927-35.
7. Jadoul P, Kitajima M, Donnez O, Squifflet J, Donnez J. Surgical treatment of ovarian endometriomas: state of the art? *Fertil Steril* 2012;98:556-63.
8. Psaroudakis D, Hirsch M, Davis C. Review of the management of ovarian endometriosis: paradigm shift towards conservative approaches. *Curr Opin Obstet Gynecol* 2014;26:266-74.
9. Kalampokas T, Kamath MS, Kalampokas E. AMH after laparoscopic surgery of the ovaries: a review. *Gynecol Endocrinol* 2013;29:408-11.
10. Somigliana E, Berlanda N, Benaglia L, Vigano P, Vercellini P, Fedele L. Surgical excision of endometriomas and ovarian reserve: a systematic review on serum antimullerian hormone level modifications. *Fertil Steril* 2012;98:1531-8.
11. Alborzi S, Keramati P, Younesi M, Samsami A, Dadras N. The impact of laparoscopic cystectomy on ovarian reserve in patients with unilateral and bilateral endometriomas. *Fertil Steril* 2014;101:427-34.
12. Busacca M, Riparini J, Somigliana E, Oggioni G, Izzo S, Vignali M, et al. Postsurgical ovarian failure after laparoscopic excision of bilateral endometriomas. *Am J Obstet Gynecol* 2006;195:421-5.
13. Chang HJ, Han SH, Lee JR, Jee BC, Lee BI, Suh CS, et al. Impact of laparoscopic cystectomy on ovarian reserve: serial changes of serum anti-Mullerian hormone levels. *Fertil Steril* 2010;94:343-9.
14. Ercan CM, Sakinci M, Duru NK, Alanbay I, Karasahin KE, Baser I. Antimullerian hormone levels after laparoscopic endometrioma stripping surgery. *Gynecol Endocrinol* 2010;26:468-72.
15. Hwu YM, Wu FS, Li SH, Sun FJ, Lin MH, Lee RK. The impact of endometrioma and laparoscopic cystectomy on serum anti-Mullerian hormone levels. *Reprod Biol Endocrinol* 2011;9:80.

16. Kwon SK, Kim SH, Yun SC, Kim DY, Chae HD, Kim CH, et al. Decline of serum antimullerian hormone levels after laparoscopic ovarian cystectomy in endometrioma and other benign cysts: a prospective cohort study. *Fertil Steril* 2014;101:435-41.
17. Sugita A, Iwase A, Goto M, Nakahara T, Nakamura T, Kondo M, et al. One-year follow-up of serum antimullerian hormone levels in patients with cystectomy: are different sequential changes due to different mechanisms causing damage to the ovarian reserve? *Fertil Steril* 2013;100:516-22 e3.
18. Suksompong S, Dejarkom S, Petyim S, Dangrat C, Orachon D, Choavaratana R. Ovarian reserve evaluation by anti-mullerian hormone in women undergoing laparoscopic cystectomy of endometrioma. *J Med Assoc Thai* 2012;95:1389-95.
19. Var T, Batioglu S, Tonguc E, Kahyaoglu I. The effect of laparoscopic ovarian cystectomy versus coagulation in bilateral endometriomas on ovarian reserve as determined by antral follicle count and ovarian volume: a prospective randomized study. *Fertil Steril* 2011;95:2247-50.
20. Raffi F, Metwally M, Amer S. The impact of excision of ovarian endometrioma on ovarian reserve: a systematic review and meta-analysis. *J Clin Endocrinol Metab* 2012;97:3146-54.
21. Tanprasertkul C, Manusook S, Somprasit C, Ekarattanawong S, Sreshthaputra O, Vutyavanich T. Antimullerian hormone changes after laparoscopic ovarian cystectomy for endometrioma compared with the nonovarian conditions. *Minim Invasive Surg* 2014;2014:654856.
22. Atabekoglu C, Taskin S, Kahraman K, Gemici A, Taskin EA, Ozmen B, et al. The effect of total abdominal hysterectomy on serum anti-Mullerian hormone levels: a pilot study. *Climacteric* 2012;15:393-7.
23. Coric M, Barisic D, Pavicic D, Karadza M, Banovic M. Electrocoagulation versus suture after laparoscopic stripping of ovarian endometriomas assessed by antral follicle count: preliminary results of randomized clinical trial. *Arch Gynecol Obstet* 2011;283:373-8.
24. Fedele L, Bianchi S, Zanconato G, Bergamini V, Berlanda N. Bipolar electrocoagulation versus suture of solitary ovary after laparoscopic excision of ovarian endometriomas. *J Am Assoc Gynecol Laparosc* 2004;11:344-7.
25. Li CZ, Liu B, Wen ZQ, Sun Q. The impact of electrocoagulation on ovarian reserve after laparoscopic excision of ovarian cysts: a prospective clinical study of 191 patients. *Fertil Steril* 2009;92:1428-35.
26. Tanprasertkul C, Ekarattanawong S, Sreshthaputra O, Vutyavanich T. Impact of hemostasis methods, electrocoagulation versus suture, in laparoscopic endometriotic cystectomy on the ovarian reserve: a randomized controlled trial. *J Med Assoc Thai* 2014;97 Suppl 8:S95-101.
27. Guo SW. Recurrence of endometriosis and its control. *Hum Reprod Update* 2009;15:441-61.
28. Coccia ME, Rizzello F, Palagiano A, Scarselli G. Long-term follow-up after laparoscopic treatment for endometriosis: multivariate analysis of predictive factors for recurrence of endometriotic lesions and pain. *Eur J Obstet Gynecol Reprod Biol* 2011;157:78-83.

29. Parazzini F, Mais V, Cipriani S, Busacca M, Venturini P. Determinants of adenomyosis in women who underwent hysterectomy for benign gynecological conditions: results from a prospective multicentric study in Italy. *Eur J Obstet Gynecol Reprod Biol* 2009;143:103-6.
30. Pateman K, Moro F, Mavrelou D, Foo X, Hoo WL, Jurkovic D. Natural history of ovarian endometrioma in pregnancy. *BMC Womens Health* 2014;14:128.
31. Roman JD. Surgical treatment of endometriosis in private practice: cohort study with mean follow-up of 3 years. *J Minim Invasive Gynecol* 2010;17:42-6.
32. Tandoi I, Somigliana E, Riparini J, Ronzoni S, Vignani P, Candiani M. High rate of endometriosis recurrence in young women. *J Pediatr Adolesc Gynecol* 2011;24:376-9.
33. Vicino M, Parazzini F, Cipriani S, Frontino G. Endometriosis in young women: the experience of GISE. *J Pediatr Adolesc Gynecol* 2010;23:223-5.
34. Vignani M, Bianchi S, Candiani M, Spadaccini G, Oggioni G, Busacca M. Surgical treatment of deep endometriosis and risk of recurrence. *J Minim Invasive Gynecol* 2005;12:508-13.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved