

The question is important because it seems premature now to pick on a unifying hypothesis to explain the association between endometriosis and infertility. Some, at least, of the association between reproductive disorders and endometriosis may be attributable to the observation bias that occurs when women with endometriosis are subjected to more tests and procedures and closer analysis than women without the problem. Muse and Wilson have thoughtfully developed their hypothesis, and it is valuable to our understanding of endometriosis. It would be helpful to have their comment on some further questions that remain open.

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1. Muse KN, Wilson EA: How does mild endometriosis cause infertility? *Fertil Steril* 38:145, 1982
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#### *Reply of the Author:*

Dr. Collins has addressed an important concept in our study of endometriosis<sup>1</sup>: that is, endometriosis may be the consequence, rather than the cause, of infertility. A similar hypothesis was proposed by Koninckx and co-workers,<sup>2</sup> who compared steroid concentrations and the presence of endometrial cells in the peritoneal fluid of ovulatory patients and patients with luteinized but unruptured follicles. Since viable endometrial cells were found in the peritoneal fluid of over 50% of women with and without endometriosis, and since progesterone and estradiol concentrations were significantly lower in patients with unruptured follicles, these authors suggested that the lower steroid levels provided a better environment for endometrial implantation and growth. In this case, infertility via the unruptured luteinized follicle syndrome would not be the consequence but the cause of endometriosis. Perhaps other mechanisms to explain the association of infertility and endometriosis exist as well. Cer-

tainly other alternative explanations should be considered.

Many obstetric and gynecologic disorders, such as endometriosis, now can be studied with scientific methods, and alternative explanations of our reported results should be encouraged. In this regard, the thoughts and comments by Dr. Collins are greatly appreciated.

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2. Koninckx PR, Ide P, Vandenbroucke W, Brosens IA: New aspects of the pathophysiology of endometriosis and associated infertility. *J Reprod Med* 24:257, 1980

### **The Luteinized Unruptured Follicle Syndrome**

#### *To the Editor:*

The recent article of Coulam et al.<sup>1</sup> is another piece of evidence for the existence of the luteinized unruptured follicle (LUF) syndrome (for a review see Koninckx and Brosens<sup>2</sup>). This syndrome was originally described in 1978<sup>2</sup> as the absence of an ovulation ostium at laparoscopy in women with an apparently normal luteal phase. The validity of this observation has been questioned, since the laparoscopic inspection is a subjective and not measurable observation. The subsequent finding that women with an ovulation ostium have high concentrations of 17β-estradiol and progesterone in their peritoneal fluid, while women with an LUF syndrome have barely elevated levels,<sup>2</sup> confirmed that the laparoscopic evaluation of an ovulation ostium was not too frequently erroneous and constituted strong evidence in favor of the existence of an LUF syndrome. The recent ultrasonic observation<sup>1</sup> is a further confirmation of the existence of an LUF syndrome.

Although no one will doubt that a cycle with an LUF is infertile, we want to draw attention to the fact that the available evidence demonstrating

that the LUF syndrome causes infertility is still very limited. Indeed, the only argument for accepting the LUF syndrome as a cause of infertility is the observation that the syndrome occurs statistically more frequently in women with unexplained infertility<sup>3</sup> or pelvic endometriosis<sup>4</sup> than in a control group.

The assay of steroids in peritoneal fluid obtained by culdocentesis and/or ultrasonography in repetitive cycles will have to demonstrate the clinical significance of the LUF syndrome in the individual patient: Does the LUF syndrome occur repetitively in each cycle, thus causing infertility? Or does the LUF syndrome occur occasionally, thus only reducing fertility by diminishing the number of fertile cycles?

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*October 11, 1982*

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1. Coulam CB, Hill LM, Breckle RT: Ultrasonic evidence for luteinization of unruptured preovulatory follicles. *Fertil Steril* 37:524, 1982
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3. Koninckx PR, Heyns WJ, Corvelyn PA, Brosens IA: Delayed onset of luteinization as a cause of infertility. *Fertil Steril* 29:266, 1978
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#### *Reply of the Author:*

Doctors Koninckx and Brosens ask an interesting and pertinent question. Whether the luteinized unruptured follicle syndrome occurs repetitively in continuous cycles in an individual patient has not been documented. In the small number of patients studied with ultrasound,<sup>1</sup> the occurrence of the luteinized unruptured follicle syndrome was 17 cycles in four patients, indicating a tendency for repetition in the affected pa-

tient. However, a study with larger numbers of patients investigated over a longer period of time is required to answer the question.

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#### **Cigarette Smoking and Semen Quality**

#### *To the Editor:*

In the paper published by Rodriguez-Rigau et al.,<sup>1</sup> it was suggested that the findings in an earlier report from this department (Evans et al.<sup>2</sup>) of a higher incidence of morphologically abnormal sperm might be explained by the presence of varicocele. Although not stated fully in our original paper, men were excluded from that study if there was a history of varicocele ligation in the past or if on physical examination with the patient standing and lying there was evidence of any varicocele. Also, men were excluded if there was Doppler evidence of any reflux of blood, whether or not there was a clinically diagnosed varicocele. In fact, the men studied in the report published by Evans et al.<sup>2</sup> were collected from a large number of patients attending the Infertility Clinic, and as far as possible all other factors that might influence sperm quality were excluded, leaving smoking as the only difference between the two groups of patients.

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