

Ovarian ultrasonography highlights precision of symptoms of ovulation as markers of ovulation

In recent years increasing interest has focused on the symptoms that accompany normal ovulation.¹ Identifying the accuracy of these symptoms as indicators of ovulation is of practical importance both to the subfertile couple trying to maximise the chance of conception and to the couple using "natural family planning" to prevent conception. Until recently it has not been possible to assess the accuracy of the symptoms because of difficulties in assessing the exact time of ovulation. Ovarian ultrasonography has now been shown to allow accurate observation of Graafian follicular growth up to the day of ovulation.^{1,2} We therefore studied the exact relation between the major symptoms of ovulation and ovulation itself.

Subjects, methods, and results

We studied 15 menstrual cycles in six normal parous volunteers (age 25-42) who had been trained in observing ovulation symptoms for the purposes of natural family planning. They recorded their cervical mucus characteristics, basal body temperature, and other subjective data on standard forms. Follicular

cultural World Health Organisation study did, however, show that over 90% of women, from all socioeconomic backgrounds, easily recognised the changing patterns of cervical mucus.¹ Nevertheless, awareness of, and confidence in, these symptoms and their use for avoiding and achieving conception remains limited. One reason may be scepticism about their accuracy as precise markers of ovulation.

Our results raise the possibility that by identifying the day of most abundant fertile type mucus women can accurately pinpoint the day of ovulation with almost the same precision as luteinising hormone measurement. This knowledge could be used to maximise the chance of conception in subfertility. Furthermore, the last day of fertile type mucus occurred on or after the day of ovulation in all cases. This confirms this day as a good reference point for identifying the beginning of the post ovulatory infertile phase (currently taken as four days later¹).

As the ovum survives for only 12-24 hours after ovulation our findings support the suggestion that when natural family planning methods fail this is due not to their unreliability but to user failure. The motivation of couples in

Day of luteinising hormone peak and symptoms of ovulation in relation to the day of ovulation as detected by ultrasound

Cycle No	Cycle length (days)	Day of ovulation (ultrasound)	Peak luteinising hormone	No of days from day of ovulation of:			
				Most abundant fertile type mucus	Last day of fertile type mucus	Day before basal body temperature rise	Last day of periovulatory pain
1	34	20	-1.0	0	0	0	0
2	34	20	0	+1	+1	+1	+2
3	44	29	0	NA	+1	0	-2
4	P	15	0	0	+1	0	-1
5	33	16	0	0	0	0	0
6	30	16	0	-1	+1	0	0
7	28	13	0	0	0	0	0
8	30	13	NA	0	0	+2	NP
9	28	14	-1	NA	+1	+1	NP
10	30	14	0	0	+1	0	0
11	33	17	0	0	+1	+1	+1
12	29	19	0	NA	+2	0	+2

P=A planned pregnancy occurred in this cycle following intercourse on day 15. NA=Not available. NP=No periovulatory pain.

development and ovulation were monitored by the full bladder technique described by Hackeloer *et al*² using a Hitachi Tomosonic EUB 25M real time scanner. The maximum follicular diameter in each ovary was measured and the dominant follicle identified and photographed. Monitoring was continued each day until two days after the appearance of the corpus luteum. All ultrasonography was carried out by one operator (JD) and he and the women were blind to each other's findings, including menstrual dates. Daily samples were taken for periovulatory serum luteinising hormone assessment (radioimmunoassay).

The ultrasound data on three of the cycles suggested persistent luteinised unruptured follicles. In the remaining 12 cycles the day of ovulation was taken as the day before the appearance of the corpus luteum on ultrasound. In nine of these cycles, as well as recording the standard markers of ovulation,¹ the women recorded the day of most abundant fertile type mucus (having the characteristics of raw egg white¹). In three cycles, however, this day was not marked because the women stated that, although a "most abundant day" had occurred, they had not recorded it as it was not part of their normal natural family planning routine.

Luteinising hormone concentrations were measured in 11 cycles. In nine there was a single peak value which coincided with the day of ovulation (see table). The day of most abundant fertile type mucus pinpointed ovulation with similar precision. The table shows that in the nine cycles when this was recorded it occurred on the day of ovulation (as determined by ultrasound) in seven. The last day of fertile type mucus, previously considered to be the most accurate marker of the day of ovulation, occurred one or two days after ovulation in eight out of 12 cycles and on the day of ovulation in only four. The day before the rise in basal body temperature coincided with the day of ovulation in eight cycles but occurred later in the rest. Pain, when it occurred, was the most insensitive marker, occurring anywhere over two days on either side of ovulation.

Comment

It could be argued that the women studied, as users of natural family planning, were not representative of the general population. The cross

avoiding intercourse during the fertile days thus plays a major part in failure rates. This motivation, or lack of it, perhaps explains why the overall failure rates have varied from about zero in both Western³ and Third World⁴ cultures to as high as 25.4% in one study.⁵

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- 2 Kerin JF, Edmonds DK, Warnes GM, *et al*. Morphological and functional relations of Graafian follicle growth to ovulation in women using ultrasonic, laparoscopic and biochemical measurements. *Br J Obstet Gynaecol* 1981;88:81-90.
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- 4 Ghosh AK, Saha S, Chatterjee D. Symptothermia via a vis fertility control. *Journal of Obstetrics and Gynaecology of India* 1982;32:443-7.
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