

P-593 Self-monitoring of hormones via a urine-based hormonal assay — a topical endeavour into telemedicine in medically-assisted reproduction (MAR)

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Study question: How can cycle monitoring using a urine-based hormonal assay device improve current clinical practice in medically assisted reproduction (MAR)?

Summary answer: A urine-based hormonal assay has the potential to overcome the inconvenience of blood tests and reduce the frequency of appointments, waiting times and patient burden.

What is known already: Cycle monitoring via ultrasound and serum-based hormonal assays during MAR can provide information on the ovarian response and assist in optimising treatment strategies and reducing complications, such as ovarian hyperstimulation syndrome (OHSS). However, blood tests may cause inconvenience to patients due to repeated venepuncture and the need for frequent clinic appointments. Urine-based assays have been historically used by fertility specialists in clinics, but since got replaced by more practical and automated serum-based assays. Novel technology utilising rapid chromatographic immunoassay to test urinary reproductive hormones in a home setting could provide an alternative to current serum-based testing at clinics.

Study design, size, duration: A questionnaire was disseminated among 24 fertility specialists (2019-2020) on the use of ultrasound and serum-based hormone monitoring in clinical practice. In addition, the literature on the reliability of urine-based hormonal assays compared to serum-based hormonal assays

during MAR was reviewed in order to examine if urine-based hormonal monitoring could be re-introduced in clinical practice using novel state-of-the-art technology.

Participants/materials, setting, methods: All 24 surveyed fertility specialists responded, representing 10 countries from across Europe, Asia and Latin America. Questions assessed the frequency and role of hormonal monitoring, the hormones tested and the drawbacks of blood tests. The PubMed search engine was used to search the Medline database for publications between 1960–2020 with (MeSH-) search terms related to cycle monitoring (e.g. fertility monitoring, controlled ovarian stimulation, ovulation confirmation) and hormonal assays (e.g. estrone-3-glucuronide or E1-3G).

Main results and the role of chance: The survey confirmed that many fertility practitioners (n=22/24) routinely conducted hormone monitoring during MAR, primarily for guiding dose adjustments (n=20/24) and indicating risk of OHSS (n=20/24). The reported drawbacks of blood tests included validity of results from different service providers, long waiting times and discomfort to patients due to travelling to clinics for tests and repeated venepunctures. The hormones routinely checked were E2 (n=22/22), P4 (n=18/22) and LH (n=15/22). The literature review revealed a relatively high correlation (correlation coefficients 0.85–0.95) between serum E2 and urinary E1-3G in gonadotrophin stimulated cycles (Lessing 1987, Catalan 1989, Rapi 1992 and Alper 1994). No studies assessed the correlation between serum P4 and urinary PdG or between serum LH and urinary LH in stimulated cycles. In natural cycles, the correlation coefficients between serum P4 and urinary PdG seemed to be slightly higher than those between serum E2 and urinary E1-3G (0.73–0.94 vs. 0.54–0.88) (Denari 1981, Munro 1991, Roos 2015, Stanczyk 1980). One study reported a moderate correlation coefficient (0.72) between serum and urinary LH in natural cycles (Roos 2015).

Limitations, reasons for caution: There is risk of selection-bias for fertility specialists included in survey, however, the 100% response rate is reassuring. The correlation coefficients between serum- and urine-based hormonal assay and the cost-effectiveness and time-efficiency of urinary assay should be confirmed in further clinical studies using a novel state-of-the-art remote urinary monitoring device.

Wider implications of the findings: Remote hormonal monitoring can be part of a novel digital health solution that includes remote ultrasound and tele-counselling to link clinics and patients at home. Especially during the unprecedented times of the COVID-19 pandemic, the prospect of remote monitoring system has the potential to improve patient experience during fertility treatment.

Trial registration number: Not applicable