

Trial registration number: not rct.

O-074 Prevalence and clearance of human papillomavirus in semen samples of infertile patients and role on sperm parameters

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Study question: The primary objective of this study was to evaluate the prevalence, clearance and genotype of human papillomavirus (HPV) semen infection in infertile males and its possible correlation with sperm parameters.

Summary answer: Our results demonstrated a very high prevalence of HPV sperm infection in infertile patients. The virus was always bound to the sperm head, the percentage of progressive motility was reduced and frequently we observed the presence of anti-sperm antibodies. No relationship between HPV genotype and sperm parameters was found.

What is known already: Several studies have shown the presence of HPV in the semen, and its frequent association with altered sperm parameters. Moreover, experimental studies have demonstrated that infected sperm are able to transmit viral genes to oocytes and that HPV may cause pregnancy loss by DNA fragmentation and apoptosis of embryonic cells. Finally, a recent study performed in couples undergoing IVF, showed a significant increase of pregnancy loss when HPV DNA was present at sperm level.

Study design, size, duration: Cross-sectional clinical study. A cohort of 750 consecutive infertile patients attending our unit was evaluated during a period of two years (between 2010 and 2012). Infertile patients were considered those subjects with altered sperm parameters, at least 2 years of unprotected sexual intercourse without conception, and normal female partners.

Participants/materials, setting, methods: All patients were evaluated at our andrology section for sperm parameters according to the WHO guidelines 2010, anti-sperm antibodies (ASAs) by the spermMar test and HPV detection on semen by polymerase chain reaction. Sperm samples from infected patients were further analyzed by fluorescence in situ hybridization (FISH) for HPV.

Main results and the role of chance: Among infertile patients, we found that 102 subjects had HPV DNA in their semen (13.6%). Infertile patients with HPV semen infection had a lower progressive sperm motility than non infected ones (28.1 ± 11.5 vs 38 ± 12.1 , $p < 0.01$) and more frequently they showed the presence of ASAs (40.3% vs 10.3%, $p < 0.01$). Moreover, patients with HPV sperm infection and ASAs had even a lower sperm motility than infected subjects without anti-sperm antibodies ($p < 0.05$). FISH analysis for HPV showed that a very high percentage of sperm had the virus bound to their head (29.1 ± 5.6). The follow-up of semen infection performed in 50 patients, showed that 36% of them cleared the virus in one year while 94% in two years.

Limitations, reason for caution: The exact mechanism by which the binding of HPV to sperm is able to reduce motility and to induce ASAs production remains unknown and it is meritable of further investigations.

Wider implications of the findings: The high prevalence of HPV sperm infection observed in infertile patients suggests a role for this infection in male infertility. Screening for HPV should be performed in the workup of infertile patients due to its association with asthenozoospermia and ASAs. Because the clearance needs about two years and FISH for HPV represents an effective method to evaluate the percentage of infected sperm, we suggest this analysis in the follow-up of infected subjects seeking fertility.

Study funding/competing interest(s): None to declare

Trial registration number: No

O-075 The prevalence and awareness of relevant modifiable lifestyle factors within a population of six hundred patients presenting for infertility treatment comparing questionnaire and interview data

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Study question: This study sought to identify the prevalence and awareness of modifiable lifestyle factors within a population of six hundred participants registering for Assisted Reproductive Technology (ART) treatment that have

been identified in previous research as impacting fertility outcomes for couples.

Summary answer: Many ART patients engage in risky lifestyle behaviours that negatively impact their preconception health and chances of having healthy offspring. Whilst patients will make increasing efforts over time to enhance their preconception health, there is confusion within ART populations about the most effective lifestyle modification for optimising reproductive outcomes.

What is known already: Reproductive outcomes are significantly impacted by preconception health and modifiable lifestyle factors such as excess or inadequate body weight, tobacco smoking, drug use and alcohol consumption. There is much confusion about the impact or relevance of lifestyle factors on fertility within patient populations. Additionally, depression and anxiety rates have been reported with higher frequency within Assisted Reproductive Technology patients. (Homan 2007, Macklon 2008, Norman, 2008, ESHRE Task Force 17 Life-style related factors 2009).

Study design, size, duration: A medical assessment and history questionnaire was adapted to include questions about modifiable lifestyle factors, depression and anxiety. The questionnaire was mailed to all couples commencing treatment with a letter confirming their initial appointment. Questionnaire and interview data from over 600 participants has been included in this study.

Participants/materials, setting, methods: Six hundred respondents to questionnaire, 300 male/ female partnered couples (female median age 34 and male median age 38 years) completed the questionnaire prior to their initial appointment with a fertility specialist at an Australian fertility clinic. A further 50 participants completed three longitudinal interviews over four months.

Main results and the role of chance: Couples have been pursuing conception for an average of 2.4 years, range 6 months to 17 years. 50% of men have not had a semen analysis. 49% of women have been pregnant and 23% of men have fathered a child(ren). 82% men consume alcohol average 9.3 drinks per week, range 1-70. 69% of women consume alcohol, average 5.4, range 1-66. 23% of males smoke, and 12.5% of females. Less than 3% disclose recreational drug use., there is greater incidence of disclosure within other contexts throughout treatment such as during nursing, andrology, medical or counselling appointments. Body mass index, 7.8% underweight, overweight 24.5%, and obese BMI35 + , 14%. Male depression 7%, anxiety 4.3%, co morbid depression/anxiety 36.8%. Female depression 13%, anxiety 15%, co morbid depression/anxiety 60%.

Limitations, reason for caution: As the questionnaires were self report and the interviews rely on recall, there is potential for recall bias. Previous research has reported people frequently underestimate their alcohol consumption and their body weight. Future studies could utilise methods to minimise recall bias errors for example weigh each participant at intake.

Wider implications of the findings: The planned nature of all ART conception presents a prime opportunity to inform and educate our patients about the impact of lifestyle choices and assist with lifestyle modification aiming for harm minimisation and optimal outcomes for patients and their potential offspring. Previous research has found that infertile couples are more likely to suffer depression and anxiety and the interrelationship between lifestyle factors and mental health requires further exploration for development of effective lifestyle modification interventions.

Study funding/competing interest(s): This research is part of a PhD study. There are no competing interests.

Trial registration number: Not applicable.

SELECTED ORAL COMMUNICATION SESSION

Session 19: Psychology and counselling

Monday 8 July 2013

15:15 - 16:30

O-076 Depression, relationship satisfaction and sexual functioning improve after laparoscopic surgery for moderate and severe endometriosis with and without bowel resection

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Study question: Is there a difference between women with moderate to severe endometriosis (rAFS-III and rAFS-IV) who underwent laparoscopic surgery with bowel resection (BR) or without bowel resection (WBR) regarding depressive symptoms, relational adjustment and sexual functioning: a prospective questionnaire study.

Summary answer: Radical (but fertility conserving) multidisciplinary surgery for endometriosis improves levels of depression, relationship adjustment and sexual functioning in both groups (BR and WBR). The BR patients showed lower levels of sexual problems with orgasm and pain during intercourse and less clinically significant levels of depression than the WBR patients.

What is known already: Pain symptoms are frequent in endometriosis patients and can have an impact on psychological, relationship and sexual functioning. There are no data available on depression and relationship adjustment after endometriosis surgery. Sexual dysfunctions have been described after bowel resection for rectal cancer but no data are available for endometriosis surgery.

Study design, size, duration: Prospective cohort study of 203 consecutive women operated at the Leuven University Fertility Center (LUFC) between 1 Sept 2006 and 30 Sept 2008 with moderate (n = 67) or severe (n = 136) endometriosis. The pre-operative response rate was respectively 84% in BR and 79% in WBR.

Participants/materials, setting, methods: The Beck Depression Inventory (BDI) measured depression, the Dyadic Adjustment Scale (DAS) relationship satisfaction and the Short Sexual Functioning Scale (SFFS) sexual functioning before and 6, 12 and 18 months after women had laparoscopic surgery at the LUFC, a tertiary referral center for fertility exploration, treatment and surgery.

Main results and the role of chance: Both groups (BR and WBR) had better post-operative outcomes when compared to preoperative assessment. Mean BDI and DAS levels were normal compared to the norm population. Over all assessment points, BR had better outcomes for DAS (p < 0.05) and SFFS 'arousal' (p < 0.05) than WBR. At six months post-op, when compared to the WBR group, the BR group reported lower mean levels of BDI (p < 0.05), lower incidence of SFFS 'pain during intercourse' and 'orgasm problems' (p < 0.05), and a lower proportion of patients with severe orgasm problems (p < 0.05). The data show that radical but fertility sparing surgery with or without bowel resection in a multi-disciplinary setting for the treatment of endometriosis results in comparable and good psychological outcomes concerning depression levels, relationship satisfaction and sexual functioning.

Limitations, reason for caution: Though the initial response rate was good, response dropped over time and was significantly higher for BR compared to WBR (p = 0.05). A responder/non-responder analysis showed no significant differences concerning pain problems for the study population. This reduces the possible risk of (positive) bias in the results.

Wider implications of the findings: Endometriosis is a complex condition and the focus should not be on a one-dimensional end-organ gynecological outcome but take into account the role of psychological factors in pain related outcome. To this end more prospective data are needed on sexual functioning and psychological outcomes.

Study funding/competing interest(s): Supported by the Clinical Research Fund of the Leuven University Hospitals, Leuven, Belgium. Uschi Van den Broeck has a fellowship of the Flanders Fund for Scientific Research (FWO Vlaanderen).

Trial registration number: *ClinicalTrials.gov ID: NCT00463398*

O-077 The impact of marital stability and re-partnering on infertility-related stress trajectories over 5 years of unsuccessful fertility treatment

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Study question: Are the trajectories of infertility-related stress over the course of unsuccessful fertility treatment different for those who remained in stable relationships and those who formed a new marital union?

Summary answer: Marital stability was a significant predictor of infertility stress initial status and change over time. Those who re-partnered not only had a significantly higher trajectory of stress over five years, but also reported significantly higher initial stress levels before re-partnering.

What is known already: Previous studies found that infertile couples have strong marital adjustment and that the experience of infertility can even strengthen their relationships. Studies comparing patients who remain in the same marital relationship over the course of several treatments with those who re-partnered and re-initiate infertility treatment are lacking.

Study design, size, duration: This study is part of the Copenhagen Multi-centre Psychosocial Infertility (COMPI) research program. Data was drawn from a prospective cohort of 2250 patients beginning fertility treatment in January 2000-August 2001 at five fertility clinics, with 1-year and 5-year follow-ups. In total, 1481 patients completed the three waves of questionnaires.

Participants/materials, setting, methods: Participants were 220 childless patients (135 women, 85 men) experiencing unsuccessful treatments for five years. COMPI Fertility Problem Stress Scales assessed fertility stress. Participants disclosed marital stability at the 5-year follow-up. Using Latent Growth Modeling, we examined change of stress over time and then introduced marital stability as a covariate.

Main results and the role of chance: At baseline, participants had on average 34.6 years, were in a marital union for 8.2 years, and had been trying to conceive for 5.2 years. At the 5-year follow-up, 6% (n = 31) of participants reported having separated and re-partnered. Infertility stress levels were higher at all time-points and showed an increasing stress trajectory over time for those who re-partnered, compared with those who remained in a stable relationship. Marital stability significantly predicted infertility stress initial status ($\beta = .224$, $P = .002$) and infertility stress growth levels ($\beta = .306$, $P = .004$), reflecting that those who formed a second union had higher initial levels of stress while in their previous relationship and higher changes in stress levels over the course of treatments.

Limitations, reason for caution: Even though almost 70% of the cohort responded to all three time-points, selection bias due to loss to follow-up could have occurred, since non-respondents to 1 and 5-year follow-ups may have divorced or re-partnered.

Wider implications of the findings: High infertility-related stress levels before entering infertility treatment can negatively affect the stability of marital relationships and lead to re-partnering. Informing patients about this finding can be important when referring to counseling. More research is needed to understand the incidence and importance of re-partnering within infertility treatments.

Study funding/competing interest(s): This study has received support from the Danish Health Insurance Fund (J.nr. 11/097-97) and five private funds. The authors have no conflicts of interest to declare.

Trial registration number: –

O-078 The relation between dropout and patient-centredness in fertility care

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Study question: Can clinic factors, including patients' experiences with patient-centred care, be used as a predictor for dropout in fertility care?

Summary answer: Clinic factors, including patients' experiences with patient-centred care, are no optimal predictor for dropout.

What is known already: In fertility care a significant proportion of patients does not achieve pregnancy, because they discontinue treatment prematurely. Many studies have tried to identify factors predicting dropout, showing incompatible results. However, these studies mainly focus on factors at the treatment and patient level, while clinic factors seems to be forgotten.

Study design, size, duration: This study was nested within a large prospective, longitudinal randomized controlled trial about the improvement of patient-centredness of Dutch fertility care. The baseline measurement of the study (T0) included 693 infertile women, who completed a questionnaire about their experiences with patient-centred care. The follow-up was one year (T1).

Participants/materials, setting, methods: All patients were under fertility treatment in one of 32 participating Dutch clinics. At T0, patient-centredness levels were determined using the Patient-Centredness Questionnaire-Infertility (PCQ-Infertility). Additional clinic characteristics were gathered through a professionals' questionnaire. At T1, we asked for patients' current status in fertility care and their main reason for discontinuation, if applicable.

Main results and the role of chance: A total of 693 non-pregnant women completed the questionnaire set at T0 and 534 women (77.1%) provided consent for follow-up. At T1 measurement, 434 women (81.3%) completed the questionnaire. Of these women, 153 women (35.2%) still continue treatment and 76 women (17.5%) dropped out. Another 175 women (40.3%) had achieved pregnancy and 30 patients (6.9%) ended treatment because of medical reasons. The levels of patient-centredness and the additional clinic characteristics did not significantly differ between dropouts and non-dropouts. However, patients who received non-ART treatments before they dropped out had significantly lower scores on the subscale 'Respect for patients' values'. Patients' receiving ART treatments and subsequently dropped out treatment, tend to have higher scores on the PCQ-Infertility subscale 'Patient involvement', with marginal significant differences ($p = 0.05$).

Limitations, reason for caution: The follow-up of our study was not complete (i.e. 81.3%), possibly biasing our results. Moreover, we excluded patients who were still in their diagnostic workup stage, while it is known that these patients dropout as well. We did so, because the PCQ-Infertility was not validated for this patient group.

Wider implications of the findings: This study provides more insight into factors influencing dropout from the clinic's perspective. Clinic factors appeared to be no optimal predictor for dropout. However, because we found both positive and negative predictors for dropout in specific patient populations, we might have collected clues that dropout can be considered both a morally bad and a good outcome. In future research, it would be interesting to explore more elements of positive and negative predictors of dropout.

Study funding/competing interest(s): This work was supported by Merck Serono, the Netherlands. No competing interests declared.

Trial registration number: -

O-079 It takes two to tango: predictive factors in both men and women for IVF treatment dropout

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Study question: The aim of our study was to investigate which factors in both men and women predict dropout from IVF treatment. Dropout on patient's initiative (passive censoring) was measured after a couple's first cycle ever, or the first cycle after a pregnancy that lasted until at least 12 weeks amenorrhoea.

Summary answer: Number of follicles, women's anxiety, women's impact of the fertility problems on daily life, both men's and women's depression, and men's satisfaction with the marital relationship predicted drop out in univariate analyses. A multivariate logistic regression in which these factors were entered, revealed a significant prediction of the total model ($p = .005$; Nagelkerk $R^2 = 3.09$).

What is known already: A significant proportion of couples discontinue IVF treatment on their own initiative before achieving pregnancy or fulfilling three reimbursed cycles. Earlier studies focussing on women reported that besides biomedical prognostic factors, impact on daily life and marital relationship as well as emotional distress contribute to dropout from IVF. In questionnaire studies, emotional distress was indicated as a reason for dropout in 22% to 49% of the respondents.

Study design, size, duration: Questionnaires were administered 3-10 days before and 3-4 weeks after IVF treatment. After exclusion from couples who achieved pregnancy, were actively censored or used donorgametes, 197 couples were included. From these couples, 160 continued IVF after their first unsuccessful cycle, while 37 couples dropped out through passive censoring.

Participants/materials, setting, methods: For both partners, anxiety (Spielberger State and Trait Anxiety Inventory; STAI), depression (Beck Depression Inventory; BDI), impact of fertility problems on daily life (Sickness Impact Scale; SIS), satisfaction with partner relationship (Maudsley Marital Questionnaire; MMQ), social support (Inventory of Social Behavior; ISB) and perceived chance of success were measured using self-report questionnaires.

Main results and the role of chance: Univariate logistic regressions of general and gynaecological background characteristics as well as psychological variables revealed a significant prediction of the number of follicles, women's anxiety, women's impact of the fertility problems on daily life, both women's and men's depression, men's satisfaction with the marital relationship for drop out. The variables that showed significant prediction were entered together in a multivariate logistic regression. This revealed a significant prediction of the total model ($p = .005$; Nagelkerk $R^2 = 3.09$). No individual factors reached significant prediction in the multivariate model, wald statistics ranged from 2.014 (follicles) to .0124 (BDI in women).

Limitations, reason for caution: Except for the measurements performed, other prognostic factors may play a role in drop out from IVF treatment. In addition, psychological and relational variables were assessed by using self report questionnaires resulting in high intercorrelation of different factors. This limits the identification of the most important factor contributing to drop out.

Wider implications of the findings: It seems as if women's predictors of dropout are more focused on individual levels, as men seem to focus also on the marital relationship. In understanding drop out of treatment and counselling couples, both women, men, relational as well as prognostic factors have to be taken into account.

Study funding/competing interest(s): none.

Trial registration number: -

O-080 Children of surrogate mothers: psychological well-being, family relationships and experiences of surrogacy

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Study question: What impact does surrogacy have on the children of surrogate mothers?

Summary answer: The children of surrogate mothers do not experience any negative consequences as a result of their mother's decision to be a surrogate, irrespective of whether or not the surrogate uses her own egg.

What is known already: Currently no studies have examined the impact of surrogacy on the surrogate mother's own family, including her children. Thus we do not know how children feel about their mother's decision to act as a surrogate or how they view their relationship towards the resultant child.

Study design, size, duration: Participants were recruited as part of a larger investigation of the long-term effects of surrogacy for surrogates and their family members. Data were collected from 36 children of surrogates at a single time point.

Participants/materials, setting, methods: Participants whose mother had been a surrogate 4-12 years prior to interview and who were aged over 12 years were eligible to take part. 36 participants (14 male, 22 female) aged 12-25 years were interviewed (response rate = 52%). Goldberg's General Health Questionnaire and Rosenberg's Self-Esteem Scale were administered.

Main results and the role of chance: 44% (15) of participants' mothers had undergone gestational surrogacy, 39% (14) had used their own egg (genetic surrogacy) and 19% (7) had completed both types of surrogacy. Most children (86%, 31) had a positive view of their mother's surrogacy. 47% (17) of children were in contact with the surrogacy child and all reported good relationships with him/her. 40% (14) of children referred to the child as a sibling or half-sibling and this did not differ between genetic and gestational surrogacy. Most children (32, 89%) reported a positive view of family life, with all enjoying spending time with their mother. Mean scores on the questionnaire assessments of psychological health and self-esteem were within the normal range and did not differ by surrogacy type.

Limitations, reason for caution: The sample size for this study was relatively small and not all children chose to take part, therefore their views cannot be known. Nevertheless, this is the first study to assess the experiences of surrogacy from the perspective of the surrogates' own children.

Wider implications of the findings: Whilst the findings of this study need to be interpreted in the context of surrogacy in the UK, they show that family relationships within the surrogate's own family are good and that the children are not negatively affected as a result of their mother's decision to be a surrogate. These results are of importance to counsellors and support groups offering advice to surrogates and intended parents.

Study funding/competing interest(s): The study is funded by the Economic and Social Research Council, UK.

Trial registration number: n/a

SELECTED ORAL COMMUNICATION SESSION

Session 20: The ovary in female infertility

Monday 8 July 2013

15:15 - 16:30

O-081 Significantly reduced ovarian reserve in female offspring of consanguine parents

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Study question: To analyze the impact of consanguinity on the reproductive health of daughters from consanguine parents.

Summary answer: Significantly reduced ovarian reserve is a likely cause of infertility in daughters of consanguine parents. Hence, in societies with a high rate of consanguinity, consanguinity-related premature ovarian failure might be a frequent cause of infertility. Thus, clinical work up requires extensive family anamnesis.

What is known already: Marriage between first grade cousins is common in various regions and populations world wide, e.g. the Middle East. In Kuwait, epidemiological studies show consanguinity rates of 50-64.3%. Retrospective epidemiological studies indicate an increased rate of children arising from marriages between first-degree cousins, while in one Swiss study, the daughters of consanguine couples showed reduced fertility. However, to date, no clinical data exists on the reproductive health of women from consanguineous marriages.

Study design, size, duration: In this observational study 301 normal cycling patients, aged ≤ 39 years and with a normal karyotype visiting the satellite centre for reproductive medicine of the university of Brussels in the state of Kuwait between January 2010 and November 2011 were included.

Participants/materials, setting, methods: Patients underwent complete history taking, including presence and degree of consanguinity. A transvaginal scan was performed on day 2/3 of the cycle and the antral follicle count (AFC) was determined. To avoid an inter-observer variation, the same investigator did all scans. Moreover, serum LH, FSH, E₂, and P were determined.

Main results and the role of chance: The median AFC of 153 non-consanguineous patients was 10.0, while the 148 patients from consanguineous parents displayed a significantly lower median AFC of 7 ($p > 0.001$). Only 10% of consanguineous patients had a normal AFC (>9) according to their age, in contrast to 55.3% of non-consanguineous women. Consanguineous patients did not exhibit an age-dependent AFC-decline that was expected and observed in non-consanguineous patients, and displayed already at around 20 years of age a premenopausal AFC. Detailed analysis of the patient history and risk-factor analysis revealed that significantly more non-consanguine patients had adnexal surgery than consanguine patients ($p < 0.001$), which excludes ovarian surgery as a cause of reduced ovarian reserve in consanguine patients. LH, FSH, E₂ and P levels did not vary between the groups.

Limitations, reason for caution: The described population was retrieved from a single center and therefore a selection bias cannot be excluded. Moreover, no AMH values are available in patients with a normal AFC. However, the rate of consanguinity in this study matches published data from Kuwait.

Wider implications of the findings: Further research based on AMH in the mentioned population

Study funding/competing interest(s): No conflicts of interests.

Trial registration number: not applicable

O-082 Can birth hypoxia affect ovarian follicular reserve

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Study question: Is the follicle reserve of the developing mammalian ovary susceptible to the effects of hypoxia at birth?

Summary answer: A brief perinatal exposure of spiny mouse (SpM) foetuses to hypoxia (7.5-8min) resulted in a significant reduction in ovarian volume and depletion of the ovarian follicular reserve at postnatal day (D) 33 compared with controls.

What is known already: Hypoxic-ischemia occurs in about 4 per 1000 live human births and 4-8% of hypoxic infants die at birth. Many of those that survive experience severe health problems from irreversible damage to the brain, kidneys, heart and lungs (Perlman et al. 1989 American Journal of Diseases in Children 143: 617). Despite the possibility that birth hypoxia may also cause lasting damage to the ovary, its effects on the mammalian ovary have not been examined previously.

Study design, size, duration: Controls: pups delivered; C-section 38D gestation (-1 day term). Treated pups: uteri isolated 38D gestation; ~8 minutes in saline; pups resuscitated. Surviving pups placed with foster dams; females killed at 33-35D postnatal age; ovaries removed for histology. Ovarian volume and follicular reserve of postnatal D33-35 SpM (control = 3; treated = 8) were compared.

Participants/materials, setting, methods: A spiny mouse near-term hypoxia model was used in which ~60% of neonates survive hypoxia treatment. Ovaries were fixed (Bouin's), embedded in glycomethacrylate, serially sectioned (10u) and stained in H&E. Ovarian volume, total follicle number and mean diameter (primordial, primary, secondary, antral) were estimated stereologically using the optical dissector method.

Main results and the role of chance: The number of primordial (3178 ± 288 [mean \pm SE]) and primordial plus primary follicles (3762 ± 401) in the control ovaries was significantly greater than in the ovaries from the hypoxia group (2177 ± 334 and 2502 ± 271 respectively, $p < 0.05$; One-way ANOVA, Tukey post-hoc). The mean diameter of primordial follicles was significantly smaller in the treated group compared to controls (20.99 ± 0.45 vs 22.03 ± 0.15 , $p < 0.05$). The volume of the ovary was also significantly reduced in the treated group (0.70 ± 0.21 vs 1.06 ± 0.09 , $p < 0.02$). The mean ovarian volume was positively correlated with mean diameter of primordial ($R^2 = 0.708$) and secondary plus antral follicles ($R^2 = 0.9487$). A pilot study that compared the maturation potential of oocytes from the follicles of control and treated ovaries from postnatal D33-35 SpM showed no significant difference in survival or maturation rates *in vitro*.

Limitations, reason for caution: This study was limited to observations in the spiny mouse. Group sizes were uneven and, while differences are significant, a larger group of controls is required to extend these data. Caution is needed in applying these findings to similar situations of birth hypoxia in other mammalian species, in particular humans.

Wider implications of the findings: This is the first evidence that birth hypoxia causes detrimental changes to ovarian structure and depletion of the follicular reserve in an adult female mammal exposed to hypoxia at birth. The results confirmed our hypothesis that like other important organs of the body the ovary is also affected by perinatal hypoxia. The spiny mouse is a proven model for near-term hypoxia and our results suggest the possibility that hypoxia may also affect the human ovary.

Study funding/competing interest(s): This study was funded from in-house budgets and the authors have no conflicting or competing interests to declare.

Trial registration number: N/A