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宫腔镜在不孕患者的应用推荐意见

中华医学会生殖医学分会

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【摘要】 不孕症发病率在我国呈上升趋势,而宫腔病变是不孕患者的常见问题之一。宫腔镜检查 and 手术是判断和解决宫腔病变的重要手段。针对不孕症患者进行宫腔镜检查及手术的指征、宫腔镜的安全性和有效性的评估尚缺乏指导性文件。本推荐意见遵循循证临床实践指南制订的方法进行,旨在加强宫腔镜临床诊疗在不孕症患者的规范应用,对医务工作者开展宫腔镜检查和治疗提供指导及临床依据。

【关键词】 不孕症; 宫腔镜; 指南; 推荐意见; GRADE

基金项目: 首都卫生发展科研专项(首发 2018-2-4085)

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Recommendations for hysteroscopy in infertile patients

Chinese Society of Reproductive Medicine

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【Abstract】 The incidence of infertility has been gradually increasing in China, and abnormality within uterine cavity is common in infertile women. Hysteroscopy is the most vital operation modality for diagnosing and treating intrauterine diseases. However, there is still no guidelines on the indications of hysteroscopy, and the evaluation of the safety and effectiveness of hysteroscopy in infertile women. The purpose of the recommendations is to provide evidence-based clinical guidance for hysteroscopic examination and treatment of infertility.

【Key words】 Infertility; Hysteroscopy; Guideline; Recommendations; GRADE

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·临床研究·

多囊卵巢综合征患者自然周期获卵数的影响因素及其与体外成熟结局的相关性分析

刘涛 刘东明 宋雪凌 郑晓英 马彩虹 李蓉 严杰 乔杰

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【摘要】 目的 探讨多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 不孕症患者自然周期获卵数的影响因素及其与体外成熟 (*in vitro* maturation, IVF) 结局的相关性。方法 本研究采用队列研究方法, 回顾 2006 年 1 月 1 日至 2019 年 12 月 31 日期间在北京大学第三医院妇产科生殖医学中心接受自然周期取卵的 586 例 PCOS 不孕症患者的临床资料, 按照获卵数 (0~8、9~19、≥20) 将患者分为 3 组, 比较组间患者的一般情况、激素水平、卵成熟和胚胎发育指标、移植周期临床妊娠和活产结局。结果 获卵数为 0~8 组、9~19 组和 ≥20 组的患者黄体生成素 (luteinizing hormone, LH) / 卵泡刺激素 (follicle-stimulating hormone, FSH) [1.00 (0.61, 1.76)、1.41 (0.86, 1.96)、1.62 (0.96, 2.14)]、睾酮水平 [1.07 (0.69, 1.91) nmol/L、1.28 (0.77, 1.95) nmol/L、1.67 (1.03, 2.75) nmol/L] 和窦卵泡计数 (antral follicle count, AFC) [(24 (19, 24)、24 (24, 30)、30 (24, 40)] 组间比较差异均有统计学意义 (均 $P < 0.001$)。多因素 logistic 回归结果显示 AFC 是影响获卵数的显著因素 ($P_{9\sim 19/0\sim 8} = 0.002$, $P_{\geq 20/0\sim 8} < 0.001$), LH/FSH 是去除 AFC 后影响获卵数最显著的内源性因素 ($P_{9\sim 19/0\sim 8} = 0.006$, $P_{\geq 20/0\sim 8} = 0.003$)。通过倾向性评分匹配 (propensity score matching, PSM) 后显示, 获卵数越多, 每未成熟卵成熟率 [0~8 组: 48.0% (242/504), 9~19 组: 44.8% (539/1202), ≥20 组: 40.4% (1067/2640), $P = 0.001$]、正常受精率 [0~8 组: 31.7% (160/504), 9~19 组: 25.5% (306/1202), ≥20 组: 23.7% (625/2640), $P = 0.001$] 和可移植胚胎率 [0~8 组: 19.2% (97/504), 9~19 组: 11.6% (140/1202), ≥20 组: 6.0% (153/2540), $P < 0.001$] 则越低, 可移植胚胎形成周期率 [0~8 组: 51.1% (47/92), 9~19 组: 66.3% (61/92), ≥20 组: 73.9% (68/92), $P = 0.005$] 则越高。移植周期不同获卵数分组间的每新鲜移植周期和每冻融移植周期临床妊娠率及活产率、累积临床妊娠率和累积活产率差异均无统计学意义 (均 $P > 0.05$)。结论 AFC 是预

测 PCOS 患者自然周期获卵数的有效指标, 同时 LH/FSH 也是影响获卵数显著的内源因素。随着获卵数的增多, 所获卵母细胞的成熟质量和发育潜能会逐渐下降, 但形成可移植胚胎的概率逐渐升高, 获卵数与移植周期临床妊娠和活产结局无显著相关性。

【关键词】 多囊卵巢综合征; 获卵数; 自然周期; 临床妊娠率; 活产率

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Relationship between the number of oocytes retrieved and *in vitro* maturation outcomes in patients with polycystic ovary syndrome undergoing natural cycles

Liu Tao, Liu Dongming, Song Xueling, Zheng Xiaoying, Ma Caihong, Li Rong, Yan Jie, Qiao Jie

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【Abstract】 **Objective** To investigate the factors that influence the number of oocytes retrieved of patients with polycystic ovary syndrome (PCOS) undergoing unstimulated natural cycles and the association between the number of oocytes retrieved and *in vitro* maturation (IVM) outcomes. **Methods** This retrospective cohort study reviewed clinical data of 586 patients with PCOS undergoing unstimulated natural cycle at Reproductive Medicine Center, Department of Obstetrics and Gynecology of Peking University Third Hospital from 2006 January 1 to 2019 December 31. All patients were divided into three groups according to the number of oocytes retrieved (0-8, 9-19, ≥ 20). Basic information, basal endocrine hormones, oocyte and embryo development index and clinical outcomes were compared among the three groups. **Results** Luteinizing hormone (LH)/follicle-stimulating hormone (FSH) [1.00(0.61,1.76), 1.41 (0.86, 1.96), 1.62(0.96, 2.14)], testosterone [1.07 (0.69, 1.91) nmol/L, 1.28 (0.77, 1.95) nmol/L, 1.67 (1.03, 2.75) nmol/L] and antral follicle count (AFC) [24 (19,24), 24 (24, 30), 30 (24, 40)] were significantly different among 0-8 group, 9-19 group and ≥ 20 group (all $P < 0.001$). Multivariate logistic regression analysis showed that AFC was a significant factor affecting the number of oocytes retrieved ($P_{9-19/0-8}=0.002$, $P_{\geq 20/0-8}<0.001$), and LH/FSH was an significant internal factor affecting the number of oocytes retrieved ($P_{9-19/0-8}=0.006$, $P_{\geq 20/0-8}=0.003$) after the removal of AFC. Results of the analysis in patients after propensity score matching (PSM) showed that the number of oocytes retrieved was negatively correlated with oocyte maturation rate [0-8 group: 48.0% (242/504), 9-19 group: 44.8% (539/1202), ≥ 20 group: 40.4% (1067/2640), $P=0.001$], fertilization rate [0-8 group: 31.7% (160/504), 9-19 group:

25.5% (306/1202), ≥ 20 group : 23.7% (625/2640), $P=0.001$] and transferable

embryo rate [0-8 group: 19.2% (97/504), 9-19 group: 11.6% (140/1202), ≥ 20 group: 6.0% (153/2540), $P<0.001$], while positively correlated with transferable embryo formation cycle rate [0-8 group: 51.1% (47/92), 9-19 group: 66.3% (61/92), ≥ 20 group: 73.9% (68/92), $P=0.005$]. There were no differences in clinical pregnancy rate and live birth rate per fresh or frozen embryo transfer cycles, cumulative clinical pregnancy rate and cumulative live birth rate among the three groups. **Conclusion** AFC has predictive value for the number of oocytes retrieved in natural cycles, and LH/FSH is an important internal factor affecting the number of oocytes retrieved. Oocyte maturation quality and development potential decrease with the increase of the number of oocytes retrieved in natural cycles, which has no direct effect on clinical outcomes.

【Key words】 Polycystic ovary syndrome; Number of oocytes retrieved; Natural cycle; Clinical pregnancy rate; Live birth rate

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·临床研究·

年龄 ≤ 35 岁卵巢储备功能低下女性的 冻融胚胎移植周期获得活产的围产期 结局分析

韦梦洁 魏艳 冯光恩 陈秋菊 柴蔚然

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【摘要】 目的 探讨卵巢储备功能低下 (diminished ovarian reserve, DOR) 对年龄 ≤ 35 岁患者通过冻融胚胎移植 (frozen-thawed embryo transfer, FET) 周期获得活产的围产期结局影响。方法 回顾性队列研究分析 2006 年 1 月至 2018 年 12 月期间在上海交通大学医学院附属第九人民医院辅助生殖科就诊的 ≤ 35 岁不孕妇女在 FET 治疗后妊娠 ≥ 24 周的围产期结局资料。将患者分为非 DOR 组 ($n=14\ 342$) 和 DOR 组 ($n=1292$)。主要观察指标为新生儿低出生体质量发生率, 次要观察指标包括婴儿胎龄、出生体质量、性别以及先天性缺陷、新生儿死亡和产妇产前合并症的发生率。采用单因素及多因素二元 logistic 回归, 统计分析 DOR 与活产新生儿出生结局以及产妇产前合并症发生率的相关性。结果 DOR 组分娩单胎、双胎的新生儿出生体质量与非 DOR 组相比差异均无统计学意义 (均 $P>0.05$)。两组间新生儿低出生体质量、早产、先天性缺陷、新生儿死亡以及产妇产前合并症的发生率等差异均无统计学意义 (均 $P>0.05$)。经多因素 logistic 分析校正混杂因素后, DOR 不是年龄 ≤ 35 岁患者行 FET 获得单胎以及双胎活产时发生低出生体质量的危险因素 (单胎校正 $OR=0.97$, 95% $CI=0.69\sim 1.34$, $P=0.831$; 双胎校正 $OR=1.14$, 95% $CI=0.95\sim 1.36$, $P=0.166$)。结论 对于年龄 ≤ 35 岁的 DOR 患者行 FET 获得的活产儿出生结局与非 DOR 患者相当。

【关键词】 受精, 体外; 卵巢储备; 冻融胚胎移植; 子代

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Analysis of perinatal outcomes of ≤ 35 years old women with diminished ovarian reserve obtained live births in frozen-thawed embryo transfer cycles

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【Abstract】 Objective To investigate the effect of diminished ovarian reserve (DOR) on perinatal outcomes of young patients obtained live births through frozen-thawed embryo transfer (FET) cycles. **Methods** In this retrospective cohort study, data of perinatal outcomes of patients who underwent FET and achieved pregnancy ≥ 24 weeks from January 2006 to December 2018 in Reproductive Medicine Department of Shanghai Ninth People's Hospital Affiliated Shanghai Jiao Tong University School of Medicine were analyzed. Patients were divided into non-DOR group ($n=14\ 342$) and DOR group ($n=1292$). The main outcome measure was the rate of low birth weight of newborns. The secondary outcome measures included infant gestational age, birth weight, gender, and incidence of congenital defects, neonatal death, and pregnancy complications. Univariate and multivariate logistic regression were applied to analyze the correlation between DOR and the outcomes of newborns and the rates of pregnancy complications. **Results** There was no statistically significant difference in the birth weight of newborns between DOR group and non-DOR group in both singleton and twin pregnancies (all $P>0.05$). There were no significant differences in incidence of low birth weight, preterm birth,

congenital defects, neonatal death, and pregnancy complications between the two groups (all $P>0.05$). After adjusting for relevant confounders by multivariate logistic regression analysis, DOR was not a risk factor for patients ≤ 35 years old to obtain singletons and twins with low birth weight through FET (singletons adjusted $OR=0.97$, 95% $CI=0.69-1.34$, $P=0.831$; twins adjusted $OR=1.14$, 95% $CI=0.95-1.36$, $P=0.166$). **Conclusion** The birth outcomes of live births obtained by FET in DOR patients ≤ 35 years old were comparable to those obtained in non-DOR patients.

【Key words】 Fertilization *in vitro*; Ovarian reserve; Frozen-thawed embryo transfer; Offspring

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·临床研究·

常规方案促排卵周期获卵数 ≤ 3 枚患者的临床结局分析

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【摘要】 目的 探讨常规方案促排卵周期获卵数 ≤ 3 枚患者的临床结局及影响因素。方法 采用回顾性队列研究, 选取 2012 年 1 月至 2017 年 1 月期间在北京大学第三医院生殖医学中心接受体外受精-胚胎移植 (*in vitro* fertilization and embryo transfer, IVF-ET) 助孕、采用常规方案促排卵治疗获卵数 ≤ 3 枚患者的临床资料, 统计分析患者新鲜移植周期妊娠结局, 并以临床妊娠为结局指标进行单因素和多因素分析, 探讨影响患者临床妊娠结局的相关因素。结果 常规方案促排卵周期获卵数 ≤ 3 枚患者新鲜移植周期临床妊娠率为 24.1% (503/2090), 活产率为 15.2% (318/2090)。以临床妊娠为结局指标进行单因素分析显示, 获卵数 ($P=0.001$)、是否预期卵巢低反应 (poor ovarian response, POR) ($P<0.001$)、年龄 ($P<0.001$)、窦卵泡计数 (antral follicle count, AFC) ($P<0.001$)、不孕年限 ($P=0.008$)、人绒毛膜促性腺激素 (human chorionic hormone, hCG) 注射日血清孕酮水平

($P=0.001$)、促排卵方案($P=0.003$)、内膜厚度($P<0.001$)、移植胚胎数($P<0.001$)是影响患者临床妊娠结局的相关因素。进一步 logistics 回归分析显示, 预期 POR [$OR(95\% CI)=0.469(0.307\sim0.718)$]、年龄[$OR(95\% CI)=0.929(0.905\sim0.954)$]、hCG 注射日血清孕酮水平[$OR(95\% CI)=0.891(0.808\sim0.984)$]、内膜厚度[$OR(95\% CI)=1.084(1.015\sim1.157)$]、移植胚胎数目[$OR(95\% CI)=1.678(1.389\sim2.026)$]是患者临床妊娠结局的独立影响因素。结论 在获卵数 ≤ 3 枚患者中, 高龄及预期 POR 及 hCG 注射日血清孕酮水平升高是影响患者临床妊娠结局的独立危险因素。

【关键词】 卵巢低反应; 临床妊娠; 获卵数

Analysis of clinical outcomes of patients with number of oocytes retrieved ≤ 3 in conventional ovulation induction cycles

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【Abstract】 Objective To explore the influencing factors of clinical outcomes in patients with No. of oocytes retrieval ≤ 3 in conventional ovulation induction cycles. **Methods** The infertility women who received *in vitro* fertilization and embryo transfer (IVF-ET) in the Center for Reproductive Medicine of Peking University Third Hospital from January 2012 to January 2017 were included in our retrospective cohort study. We analyzed the IVF outcomes of all the patients, as while univariate and multivariate analysis were conducted to explore the related factors influencing clinical pregnancy outcome. **Results** The clinical pregnancy rate and the live birth rate of the patients were respectively 24.1% (503/2090) and 15.2% (318/2090). Univariate analysis with clinical pregnancy as outcome index showed that the number of retrieved oocytes ($P=0.001$), expected poor ovarian response (POR) ($P<0.001$), age ($P<0.001$), antral follicle count (AFC) ($P<0.001$), infertility duration ($P=0.008$), progesterone level on human chorionic hormone (hCG) injection day ($P=0.001$), ovulation induction protocol ($P=0.003$), endometrial thickness ($P<0.001$), and the number of transferred embryos ($P<0.001$) were the related factors affecting clinical pregnancy outcome. Further logistic regression analysis showed that expected POR [$OR(95\% CI)=0.469(0.307\sim0.718)$], age [$OR(95\% CI)=0.929(0.905\sim0.954)$], progesterone level on hCG injection day [$OR(95\% CI)=0.891(0.808\sim0.984)$], endometrial thickness [$OR(95\% CI)=1.084(1.015\sim1.157)$] and the number of transferred embryos [$OR(95\% CI)=1.678(1.389\sim2.026)$] were the independent influencing factors of clinical pregnancy outcome. **Conclusion** Elder age, expected POR and higher progesterone level on hCG injection day are independent risk factors for clinical pregnancy outcome of patients with IVF-ET and the number of oocytes retrieved ≤ 3 .

【Key words】 Poor ovarian response; Clinical pregnancy; No. of oocytes retrieved

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·临床研究·

年龄 ≤ 35 岁鲜胚移植患者血清抗苗勒管激素水平与妊娠结局的关系

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【摘要】 目的 研究年龄 ≤ 35 岁行鲜胚移植的不孕症患者血清抗苗勒管激素(anti-Müllerian hormone, AMH)水平与妊娠结局的相关性。方法 采用回顾性队列研究分析了2018年1月至2019年12月期间于湖北医药学院附属人民医院生殖医学中心行体外受精-胚胎移植(*in vitro* fertilization and embryo transfer, IVF-ET)助孕鲜胚移植后的1608例年龄 ≤ 35 岁患者的临床资料。按血清AMH水平将患者分为2组: AMH $\leq 1 \mu\text{g/L}$ 组(147例), AMH $> 1 \mu\text{g/L}$ 组(1461例)。对两组的主要结局指标(临床妊娠率、流产率、活产率)和次要结局指标(促排卵参数、胚胎参数)进行比较, 并采用多元回归分析血清AMH水平与流产率的相关性。结果 AMH $\leq 1 \mu\text{g/L}$ 组患者的基础窦卵泡计数(5.84 ± 3.00)、获卵数[(8.18 ± 3.57) 个]、冷冻胚胎数[(1.03 ± 1.36) 个]均少于AMH $> 1 \mu\text{g/L}$ 组[6.88 ± 3.58 , $P=0.001$; (10.07 ± 2.72) 个, $P<0.001$; (1.92 ± 1.58) 个, $P<0.001$]; AMH $\leq 1 \mu\text{g/L}$ 组的总促性腺激素(gonadotropin, Gn)用量[$(2\,609.81 \pm 1273.88)$ U]多于AMH $> 1 \mu\text{g/L}$ 组[$(2\,380.22 \pm 887.47)$ U, $P=0.004$]。两组的临床妊娠率、流产率、活产率差异均无统计学意义(均 $P>0.05$)。多元回归分析结果示AMH水平与流产率之间并无相关性($OR=0.948$, 95% $CI=0.875\sim 1.028$, $P=0.197$)。结论 在年龄 ≤ 35 岁的不孕症女性中, 血清低AMH水平并不增加鲜胚移植后的流产率, 也不能预测临床妊娠率和活产率。

【关键词】 受精, 体外; 胚胎移植; 抗苗勒管激素; 流产; 卵巢储备功能

Association between serum anti-Müllerian hormone levels and miscarriage rates in fresh embryo transfer patients aged ≤ 35 years

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【Abstract】 Objective To investigate the association between serum anti-Müllerian hormone (AMH) levels and pregnancy outcomes in infertile patients aged ≤ 35 years undergoing fresh embryo transfer. **Methods** A total of 1508 patients aged ≤ 35 years who underwent fresh embryo transfer for *in vitro* fertilization and embryo transfer (IVF-ET) at the Department of Human Reproductive Center, Renmin Hospital, Hubei University of Medicine from January 2018 to December 2019 were retrospectively cohort analyzed, and the patients were divided into two groups according to AMH level: AMH ≤ 1 $\mu\text{g/L}$ group with 147 patients, AMH > 1 $\mu\text{g/L}$ group with 1461 patients. The primary outcomes (clinical pregnancy rate, abortion rate and live birth rate) and the secondary outcomes (clinical characteristics, ovulation induction parameters and embryo parameters) were compared. And multiple regression was used to analyze the correlation between serum AMH levels and miscarriage rate. **Results** The number of basal sinus follicles (5.84 ± 3.00), oocytes retrieved (8.18 ± 3.57) and frozen embryos (1.03 ± 1.36) of AMH ≤ 1 $\mu\text{g/L}$ group were less than those of AMH > 1 $\mu\text{g/L}$ group (6.88 ± 3.58 , $P=0.001$; 10.07 ± 2.72 , $P<0.001$; 1.92 ± 1.58 , $P<0.001$). The total gonadotropin (Gn) used dosage of AMH ≤ 1 $\mu\text{g/L}$ group [$2\ 609.81 \pm 1\ 273.88$] U was greater than that of AMH > 1 $\mu\text{g/L}$ group [$2\ 380.22 \pm 887.47$] U, $P=0.004$. There were no significant differences in clinical pregnancy rate, abortion rate and live birth rate between the two groups ($P>0.05$). Multiple regression analysis showed no correlation between AMH level and miscarriage rate ($OR=0.948$, 95% $CI=0.875-1.028$, $P=0.197$). **Conclusion** In infertile women ≤ 35 years old, serum low AMH levels do not increase miscarriage rates after fresh embryo transfer, nor do they predict clinical pregnancy and live birth rates.

【Key words】 Fertilization *in vitro*; Embryo transfer; Anti-Müllerian hormone; Abortion; Ovarian reserve

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·临床研究·

孕期抑郁对早产和低出生体质量影响的辅助生殖队列研究

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周俊兰和彭晓清对本文有同等贡献

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【摘要】 目的 探讨接受辅助生殖治疗的母亲孕期抑郁与子代早产和低出生体质量的关系。方法 运用回顾性队列研究分析 2017 年 5 月至 2020 年 12 月期间在安徽医科大学第一附属医院妇产科生殖中心行辅助生殖治疗且成功分娩的不孕患者单胎妊娠病历资料, 共 376 例。采用二元 logistic 回归分析模型, 分别分析孕前、早、中、晚期抑郁及孕期新发抑郁与子代早产和低出生体质量之间的关联。结果 孕前、早、中、晚的抑郁检出率分别为 20.0% (75/376)、23.0% (83/363)、11.2% (41/366)、8.8% (31/354)。孕前、早、中期抑郁与早产之间的关联均无统计学意义 (均 $P>0.05$); 孕晚期抑郁 ($RR=2.18$, 95% $CI=1.02\sim4.65$, $P=0.040$) 及孕期新发抑郁 ($RR=2.03$, 95% $CI=1.01\sim4.05$, $P=0.046$) 与发生子代早产的风险呈正相关。孕前、早、中、晚期抑郁及孕期新发抑郁与低出生体质量之间的关联均无统计学意义 (均 $P>0.05$)。结论 辅助生殖助孕患者孕晚期抑郁及孕期新发抑郁可能是导致早产的重要危险因素, 但孕期抑郁与发生低出生体质量的风险无显著关联。

【关键词】 生殖技术, 辅助; 孕期抑郁; 早产; 低出生体质量

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Effect of maternal depression in assisted reproductive technology on offspring's premature delivery and low birth weight

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【Abstract】 Objective To evaluate the relationship between antenatal depression in mothers who received assisted reproductive technology (ART) and premature birth and low birth weight. **Methods** In this retrospective cohort study, 376 infertile women who successfully delivered single-child were recruited at the Reproductive Center, Department of Obstetrics and Gynecology of the First Affiliated Hospital of Anhui Medical University from May 2017 to December 2020. Binary

logistic regression analysis model was used to analyze the association between pre-pregnancy depression, depression in the first, second and third trimesters and new onset depression during pregnancy with preterm delivery and low birth weight.

Results The detection rates of depression before pregnancy, in the first, second and third trimesters of pregnancy were 20.0% (75/376), 23.0% (83/363), 11.2% (41/366), 8.8% (31/354), respectively. There was no statistically significant association between depression in the pre-pregnancy, the first trimester and the second trimester and preterm delivery (all $P>0.05$). Depression in the third trimester ($RR=2.18$, 95% $CI=1.02-4.65$, $P=0.040$) and new onset depression during pregnancy ($RR=2.03$, 95% $CI=1.01-4.05$, $P=0.046$) were positively correlated with preterm delivery. The associations between pre-pregnancy depression, depression in the first, second and third trimesters, and new onset depression and low birth weight were not statistically significant (all $P>0.05$). **Conclusion** Antenatal depression in the third trimester and new onset depression during pregnancy may be important risk factors for premature delivery, but there is no significant association between antenatal depression and low birth weight.

【Key words】 Reproductive technology, assisted; Antenatal depression; Premature delivery; Low birth weight

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·实验研究·

大麻素受体在子宫腺肌病患者子宫肌层中的表达及其与痛经相关性的研究

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【摘要】 目的 观察 1 型大麻素受体 (cannabinoid receptor 1, CB1) 和 2 型大麻素受体 (cannabinoid receptor 2, CB2) 在子宫腺肌病患者子宫内膜肌层交界区 (endometrial-myometrial interface, EMI) 和外周肌层 (outer myometrium, OM) 的表达及其与痛经的关系。方法 本研究为病例对照研究, 纳入首都医科大学附属北京妇产医院 2016 年 7 月至 2018 年 1 月期间因子宫腺肌病行子宫全切除术

患者 45 例为子宫腺肌病组（其中增生期 23 例，分泌期 22 例），选择同期因宫颈上皮内瘤变Ⅲ级或宫颈癌 I a 期等切除子宫的非腺肌病患者 34 例为对照组（其中增生期 22 例，分泌期 12 例）。子宫切除后立即进行组织取材，采用实时荧光定量 PCR 以及 Western blotting 检测 *CB1* 和 *CB2* mRNA 和蛋白表达，并比较 *CB1* 和 *CB2* 表达水平与痛经视觉模拟评分（visual analogue scale, VAS）的相关性。结果 子宫腺肌病组 *CB1* 和 *CB2* mRNA 以及蛋白的表达量均显著高于对照组（*CB1* mRNA: 0.119 ± 0.064 比 0.000 ± 0.010 , $P<0.001$; *CB2* mRNA: 0.048 ± 0.033 比 0.005 ± 0.009 , $P<0.001$; *CB1* 蛋白: 1.76 ± 0.12 比 1.14 ± 0.15 , $P<0.001$; *CB2* 蛋白: 1.89 ± 0.15 比 1.13 ± 0.18 , $P<0.001$ ）。在子宫腺肌病组以及对照组子宫 EMI 以及 OM, *CB1* mRNA 增生期与分泌期比较，差异均无统计学意义（均 $P>0.05$ ）。在子宫腺肌病组, *CB1* mRNA 的表达在 EMI 显著高于 OM（增生期: 0.119 ± 0.064 比 0.059 ± 0.035 , 分泌期: 0.124 ± 0.067 比 0.053 ± 0.044 , 均 $P<0.001$ ），但对照组中差异无统计学意义（ $P>0.05$ ）。EMI 的 *CB1* 表达与痛经程度呈正相关（ $R^2=0.291$, $P<0.001$ ）。结论 子宫腺肌病患者子宫肌层中 *CB1* 和 *CB2* 的表达均上调，且在 EMI 中的表达高于 OM。EMI 的 *CB1* 表达与痛经程度呈正相关，而 *CB2* 的表达与痛经程度无明显相关，提示 *CB1* 可能参与了子宫腺肌病患者痛经的发生。

【关键词】 子宫腺肌病； 大麻素受体； 子宫肌层； 痛经

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Expression of cannabinoid receptors in myometrium of patients with adenomyosis and its correlation with dysmenorrhea

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【Abstract】 Objective To observe the expression of cannabinoid receptor 1 (*CB1*) and cannabinoid receptor 2 (*CB2*) in the endometrial-myometrial interface (EMI) and outer myometrium (OM) in patients with adenomyosis and its relationship with dysmenorrhea. **Methods** This study was a case-control study. Totally 45 patients who underwent total hysterectomy for adenomyosis from July 2016 to January 2018 at Beijing Obstetrics and Gynecology Hospital Affiliated to Capital Medical University were included as adenomyosis group (23 in the proliferative stage and 22 in the secretory stage), and 34 patients with non-adenomyosis who had their uterus removed for cervical intraepithelial neoplasia grade III or cervical cancer stage Ia during the same period were selected as control group (22 in the proliferative stage and 12 in the secretory stage). Immediately after hysterectomy, real-time fluorescence quantitative PCR and Western blotting were used to detect the expression of *CB1* and *CB2* mRNA and protein. The correlation between *CB1* or *CB2* expression levels and visual analogue scale (VAS) was also compared. **Results** The expression of both *CB1* and *CB2* mRNA and protein were significantly higher in adenomyosis group than in the control (*CB1* mRNA: 0.119 ± 0.064 vs. 0.000 ± 0.010 , $P<0.001$; *CB2* mRNA: 0.048 ± 0.033 vs. 0.005 ± 0.009 ,

$P<0.001$; CB1 protein: 1.76 ± 0.12 vs. 1.14 ± 0.15 , $P<0.001$; CB2 protein: 1.89 ± 0.15 vs. 1.13 ± 0.18 , $P<0.001$). In adenomyosis and control groups of uterine EMI and OM, the differences were not statistically significant ($P>0.05$) when comparing the CB1 mRNA between the proliferative and secretory phases. In the adenomyosis group, CB1 mRNA expression was significantly higher in EMI than in OM (proliferative stage: 0.119 ± 0.064 vs. 0.059 ± 0.035 , progesterational stage: 0.124 ± 0.067 vs. 0.053 ± 0.044 , $P<0.001$), but no statistically significant difference was observed in the control ($P>0.05$). CB1 expression in EMI was positively correlated with the degree of dysmenorrhea ($R^2=0.291$, $P<0.001$). **Conclusion** The expressions of both CB1 and CB2 were upregulated in the uterine myometrium of patients with adenomyosis and were higher in EMI than in OM. CB1 expression in EMI was positively correlated with the degree of dysmenorrhea, whereas CB2 expression was not significantly correlated with the degree of dysmenorrhea, suggesting that CB1 may be involved in the development of dysmenorrhea in patients with adenomyosis.

【Key words】 Adenomyosis; Cannabinoid receptor; Uterine myometrium; Dysmenorrhea

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·实验研究·

Cfap65 基因敲除对小鼠精子发生的影响

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【摘要】 目的 探讨 *Cfap65* 基因敲除对小鼠精子发生的影响。方法 利用 CRISPR/Cas9 技术构建 *Cfap65* 基因敲除小鼠；使用 PCR 和 Sanger 测序方法进行小鼠基因型鉴定；依据小鼠基因型将小鼠分为 *Cfap65*^{-/-} 组 ($n=3$) 与野生型组 ($n=3$)；生育力试验评估小鼠生育力；使用 HE 染色、免疫荧光、透射电子显微镜观察小鼠附睾精子与睾丸精子形态；使用定量实时聚合酶链锁反应检测 *Cfap65* mRNA 在小鼠心、肝、脾、肺、肾和睾丸组织中的表达。结果 *Cfap65*^{-/-} 组小鼠表现为完全不育，附睾精子数量减少和活动率低下，形态观察可见精子出现短尾、卷尾和尾部缺失，头部畸形率也显著高于野生型小鼠 ($1.67\% \pm 0.44\%$ 比 $33.00\% \pm 1.53\%$)，差异有统计学意义 ($P < 0.001$)。*Cfap65* 基因敲除导致小鼠精子结构异常。*Cfap65* 高表达于成年小鼠的睾丸、肺中；*Cfap65* 在小鼠睾丸中的表达从 4 周龄到 6 周龄有一个急剧的增加 (901.90 ± 33.19 比 $2\,144.00 \pm 22.92$)，差异有统计学意义 ($P < 0.001$)。结论 *Cfap65* 表达具有组织特异性，缺失后导致雄性小鼠精子发生障碍，这可能与精子运输障碍有关。

【关键词】 精子发生； 精子变态； 精子鞭毛； *Cfap65*

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Effect of *Cfap65* deficiency on mouse spermatogenesis

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【Abstract】 **Objective** To explore the effect of *Cfap65* deficiency on mouse spermatogenesis. **Methods** CRISPR/Cas9 technology was utilized to construct *Cfap65* deficient mice. PCR and Sanger sequencing were adopted to identify mouse genotypes. Mice were divided into *Cfap65*^{-/-} group ($n=3$) and wild-type (WT) group ($n=3$) based on genotypes of mice. Fertility test was applied to evaluate the fertility of mice. Sperm morphology of *Cfap65* deficient mice was observed by hematoxylin-eosin (HE) staining, immunofluorescence and transmission electron microscope. Real-time fluorescent quantitative PCR was used to detect the expression of *Cfap65* mRNA in heart, liver, spleen, lung, kidney and testis tissues of mice. **Results** *Cfap65* deficient male mice were completely infertile. Compared with wild-type male mice, *Cfap65* deficient mice had fewer and less motile epididymal spermatozoa, whose flagellums tend to be short, curled, bent and even absent, and heads tend to be deformed ($1.67\% \pm 0.44\%$ vs. $33.00\% \pm 1.53\%$), and the differences were statistically significant ($P < 0.001$). Besides, *Cfap65* deficiency led to anomalous structure of manchette of mice. *Cfap65* was highly expressed in the testes and lung of adult mice, and the expression of *Cfap65* in testes embodied a sharp increase trend from mice aged 4 to 6 weeks (901.90 ± 33.19 vs. $2\,144.00 \pm 22.92$), and the differences were statistically significant ($P < 0.001$). **Conclusion** The expression of *Cfap65* is tissue-specific, and the deletion of *Cfap65* leads to spermatogenesis

failure in male mice, which might be related to the dysfunction of intra-manchette transport.

【Key words】 Spermatogenesis; Spermiogenesis; Sperm flagellum; *Cfap65*

Fund program: Chinese Medical Association Clinical Medicine Research Project (18010270756); Foundation of Jiangsu Provincial Health Commission (F201866,H2018050); The Foundation of Zhejiang Medicine and Health Technology (2019KY622); Gusu Health Talents Project (GSWS2019053)

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·临床报道·

中国 YqAZF 微缺失筛查室间质量评价结果分析 (2017—2019)

中国医师协会男科与性医学医师分会 Y 染色体微缺失筛查质控联盟委员会

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【摘要】 目的 分析 2017 年至 2019 年连续 3 年不同实验室 Y 染色体长臂无精子因子 (Yq azoospermia factor, YqAZF) 微缺失检测的室间质量评价 (YqAZF microdeletion external quality assessment, YEQA) 结果, 以期改进和规范 YqAZF 微缺失检测质量管理体系提供指导意见。方法 总结 2017 年至 2019 年期间由中国医师协会男科医师分会组织开展 YEQA 质控, 每年向参与单位发放 3 个全血抽提的 DNA 质控品, 包括无 YqAZF 微缺失、YqAZFb+c 微缺失、YqAZFc 微缺失等不同类型样本。各单位按规定要求上报检测方法、仪器和试剂、检测结果和结果解释等信息。专家对反馈结果进行评判及分析, 得出分数和整体描述性评价。结果 2017 年至 2019 年 YEQA 参与单位数逐年递增, 3 年累计报名 172 家, 有效结果回收 148 家, 回收率 86.0% (148/172)。3 年回收率分别为 90.2%、92.6%、79.2%。参与单位来自 9 类不同实验室, 以检验科/中心实验室、生殖/遗传中心为主; 检测方法上, 91.9% (136/148) 为实时荧光 PCR 法检测; 检测结果总分存在波动性, 其中基因型检测平均得分率逐年递增 (2017 年至 2019 年分别为 88.3%、93.0%、94.7%), 而

对检测结果的临床解释最为薄弱。2018 年总平均分最高，为 86.8 分。结论 中国 YEQA 连续 3 年调查结果整体情况令人满意。但仍存在个别单位基因型检测错误、报告格式不规范、临床解释不全面等问题。检测单位应加强质量控制意识，及时采取措施纠正检测过程中出现的偏差和错误，积极参与 YEQA 计划，以提高 YqAZF 微缺失检测整体水平。

【关键词】 Y 染色体长臂无精子因子； 微缺失筛查； 男性不育； 室内质量评价

基金项目：上海申康医院发展中心临床三年行动计划（SHDC2020CR3077B）；宁夏回族自治区重点研发计划项目（2020BFH02002）；国家重点研发计划（2017YFC1002003）；上海市科委“科技创新行动计划”港澳台科技合作项目（21410760300）

Analysis of 3 years-external quality assessment results of YqAZF microdeletion detection in China (2017–2019)

Y Chromosome Microdeletion Screening and Quality Control Alliance Committee of Andrology and Sexual Medicine Branch of China Medical Association

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【Abstract】 Objective To analyze the external quality assessment results of Yq azoospermia factor (YqAZF) microdeletion (YEQA) in China from 2017 to 2019 in order to improve and standardize the quality assessment system of YqAZF microdeletion detection. **Methods** The nationwide YEQA was organized by the Andrology Committee of Chinese Medical Doctor Association. In each year during 2017 to 2019, three DNA quality control samples extracted from whole blood, including different types of YqAZF microdeletion samples, such as no YqAZF microdeletion, losses of YqAZFb+c or YqAZFc, were distributed to the participating institutions. All institutions reported the testing methods, instruments and reagents, testing results and other information in the prescribed format. Experts from China Alliance Committee of YqAZF screening evaluated and analyzed the feedback results, and obtained the score and overall descriptive evaluation. **Results** The number of YEQA participating units increased year by year from 2017 to 2019, with a total of 172 units enrolled in the 3 years and 148 valid results recovered, with a recovery rate of 86.0% (148/172). The 3-year recovery rates were 90.2%, 92.6%, and 79.2%, respectively. The participating departments were from 9 different departments, mainly from the artificial reproductive/genetic center and clinical/central laboratory. In terms of methodology, real-time PCR detection was the majority [91.9% (136/148)]. The total score fluctuated, with the highest overall average score in 2018. The average score of genotype detection increased year by year (88.3%, 93.0%, 94.7%, respectively), while the clinical interpretation of the testing results was the weakest part. The highest overall mean score was 86.8 in 2018. **Conclusion** In general, the improvements of 3-year YEQA in China is satisfactory. However, there are still some problems, such as irregular report format, incomplete clinical interpretation and even wrong genotype result. Testing institutions should be strengthened the awareness of quality control, taken timely measures to correct the

deviations and errors in the testing process, and actively participate in YEQA program to improve the quality of YqAZF microdeletion detection in China.

【Key words】 Yq azoospermia factor; Microdeletion detection; Male infertility; External quality assessment

Fund program: Clinical Research Plan of SHDC (SHDC2020CR3077B); Key Project of Research and Development of Ningxia Hui Autonomous Region of China (2020BFH02002); National Key R&D Program of China (2017YFC1002003); Shanghai Scientific and Technological Project (21410760300)

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·临床报道·

滋肾育胎丸对多囊卵巢综合征合并不孕患者性激素水平及子宫内膜容受性的影响

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【摘要】 目的 探讨滋肾育胎丸对多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 合并不孕患者性激素水平及子宫内膜容受性的影响。方法 本研究采用随机对照研究, 选择 2018 年 10 月至 2019 年 10 月期间于乌鲁木齐市妇幼保健院生殖医学中心就诊的 120 例 PCOS 合并不孕患者, 随机分为对照组 ($n=60$)、研究组 ($n=60$), 对照组在月经周期的第 5 日开始口服来曲唑治疗, 研究组在此基础上增加滋肾育胎丸治疗, 至人绒毛膜促性腺激素 (human chorionic gonadotropin, hCG) 注射日停用。分别比较月经周期第 3 日和 hCG 注射日两组的激素 [包括促黄体生成素 (luteinizing hormone, LH)、卵泡刺激素 (follicle-stimulating hormone, FSH)、雌二醇] 水平、子宫内膜厚度及形态, 比较两组的排卵率、妊娠率及流产率。结果 ①研究组排卵率 [83.33% (50/60)]、妊娠率 [40.00% (24/60)] 明显高于对照组 [71.67% (43/60), $P=0.043$; 31.67% (19/60), $P<0.001$]; 研究组流产率 [11.67% (7/60)] 明显低于对照组 [26.67% (16/60), $P=0.037$]。②月经周期第 3 日研究组的 LH 水平、FSH 水平、雌二醇水平与对照组相比差异均无统计学意义 (均 $P>0.05$)。hCG 注射日研究组的 LH 水平 [(18.93 ± 2.81) U/L] 明显高于对照组 [(17.21 ± 3.05) U/L], 差异有统计学意义 ($P=0.002$); hCG 注射日研究组的 FSH 水平、雌二醇水平与对照组相比差异均无统计学意义 (均 $P>0.05$)。月经周期第 3 日研究组子宫内膜厚度及形态与对照

组相比差异无统计学意义 ($P>0.05$)。hCG 注射日研究组子宫内膜厚度 [(9.05 ± 3.16) mm] 明显高于对照组 [(7.81 ± 2.53) mm] , 差异有统计学意义 ($P=0.018$) , 同时子宫内膜形态与对照组相比, 差异有统计学意义 ($P=0.039$)。结论 滋肾育胎丸可通过改善卵巢功能及提高子宫内膜容受性, 提高 PCOS 合并不孕患者的妊娠率, 降低流产率。

【关键词】 多囊卵巢综合征; 滋肾育胎丸; 不孕; 性激素

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Effect of Zishen Yutai pill on sex hormone level and endometrial receptivity in patients with polycystic ovary syndrome complicated with infertility

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【Abstract】 Objective To explore the effect of Zishen Yutai pill on sex hormone levels and endometrial receptivity in patients with polycystic ovary syndrome (PCOS) complicated with infertility. **Methods** Totally 120 patients with PCOS complicated with infertility treated in the Reproductive Medicine Center of Urumqi Maternal and Child Health Hospital in China from October 2018 to October 2019 were randomly divided into control group ($n=60$) and study group ($n=60$). The control group began oral letrozole treatment on the 5th day of the menstrual cycle, while the study group added Zishen Yutai pill treatment on this basis, and stopped until the injection day of human chorionic gonadotropin (hCG). The hormone levels [including luteinizing hormone (LH), follicle-stimulating hormone (FSH), estradiol (E_2)], endometrial thickness and morphology of the two groups on the 3rd day of menstrual cycle were compared, and then the ovulation rate, the pregnancy rate and the abortion rate of the two groups were compared. **Results** 1) The ovulation rate [83.33% (50/60)] and the pregnancy rate [40.00% (24/60)] in study group were significantly higher than those in control group [71.67% (43/60), $P=0.043$; 31.67% (19/60), $P<0.001$]. The abortion rate in study group [11.67% (7/60)] was significantly lower than that in control group [26.67% (16/60), $P=0.037$]. 2) On the 3rd day of menstrual cycle, there was no significant difference in the levels of LH, FSH and E_2 between study group and control group. The level of LH [(18.93 ± 2.81) U/L] in study group on hCG injection day was significantly higher than that in control group [(17.21 ± 3.05) U/L, $P=0.002$]. There were no significant differences in the levels of FSH and E_2 between study group and control group. 3) On the 3rd day of menstrual cycle, there was no significant difference in endometrial thickness and morphology between study group and control group ($P>0.05$). The endometrial thickness of study group [(9.05 ± 3.16) mm] on hCG injection day was significantly higher than that of control group [(7.81 ± 2.53) mm], the difference was statistically significant ($P=0.018$), and the endometrial morphology was statistically different compared with control group ($P=0.039$). **Conclusion** Zishen Yutai pill can improve the ovarian function and endometrial receptivity, increase the pregnancy rate and reduce the abortion rate of the infertile patients with PCOS.

【Key words】 Polycystic ovary syndrome; Zishen Yutai pill; Infertility; Gonadal steroid hormones

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·综述·

利用胚胎培养液中游离 DNA 进行无创植入前遗传学检测的研究进展

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【摘要】 胚胎在体外生长过程中会向培养液中释放游离 DNA (cell-free DNA, cfDNA)。cfDNA 指游离于细胞外的 DNA 片段, 是胚胎发育过程中细胞生理性凋亡的产物。利用 cfDNA 进行无创胚胎植入前遗传学检测 (non-invasive preimplantation genetic testing, niPGT) 具有无创、操作简便等优点, 已在胚胎染色体非整倍体检测及单基因疾病诊断方面取得了初步进展。然而, 目前 niPGT 临床应用的有效性、母源污染和 cfDNA 来源等问题仍存在争议。本文对 niPGT 在临床方面应用现状及 cfDNA 来源进行综述, 并对其局限性及未来应用前景提出观点, 为 niPGT 应用于临床实践提供参考。

【关键词】 受精, 体外; 胚胎游离 DNA; 无创胚胎植入前遗传学检测; 废弃培养液

Research progress of non-invasive preimplantation genetic testing by analysis of cell-free DNA released by human embryos into spent culture media

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【Abstract】 Human embryos release cell-free DNA (cfDNA) into the culture medium during *in vitro* growth. cfDNA is composed of extracellular DNA fragments which are released from the cells as a result of necrosis or apoptosis. Use cfDNA for non-invasive preimplantation genetic testing (niPGT) has the advantages of non-invasive, easy to operate, and has made preliminary progress in the preimplantation genetic testing for aneuploidies and monogenic defects. However, the effectiveness of niPGT in clinical application, maternal contamination and the source of cfDNA are still controversial. In this paper, the clinical application of niPGT and the sources of cfDNA were reviewed, and the limitations and future application prospects of niPGT were put forward to provide reference for clinical practice.

【Key words】 Fertilization *in vitro*; Embryonic cell-free DNA; Non-invasive preimplantation genetic testing; Spent culture medium

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·综述·

自然周期体外受精在辅助生殖领域的应用

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【摘要】 近年, 随着治疗理念的转变和经验的积累, 损伤小、更接近生理状态的自然周期体外受精 (*in vitro* fertilization, IVF) 越来越受到青睐。自然周期 IVF 不仅可以降低治疗成本, 还能有效减少患者来院就诊次数, 提高治疗的满意度和依从性。卵泡提前破裂等导致的周期取消率高仍是自然周期 IVF 面临的主要问题。高龄、子宫内膜容受性下降等也是影响妊娠结局的危险因素。虽自然周期 IVF 并不降低胚胎染色体异常风险, 但产科结局仍优于常规 IVF。本文从自然周期 IVF 的定义出发, 就其在辅助生殖治疗过程中的关键技术环节、影响妊娠结局的因素分析和子代安全性及围产结局等方面作一综述。

【关键词】 受精, 体外; 胚胎移植; 妊娠结局; 自然周期; 改良自然周期

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Application of natural cycle *in vitro* fertilization in the reproductive medicine

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【Abstract】 In recent years, with the transforming of therapy conception and accumulation of clinical experience, natural cycle *in vitro* fertilization (NC-IVF) receives more concerns due to its slight damage and more approach to physiological state. The application of NC-IVF reduces the therapy cost and visiting frequency, at the same time improves the patient satisfaction and compliance. The high cancellation rate of cycles caused by premature rupture of follicles remains the major problem of NC-IVF. Advanced age and reduction of uterine receptivity are also risk factors affecting pregnancy outcomes for NC-IVF. Although NC-IVF can not reduce risks of fetal chromosomal abnormalities, its obstetric outcomes are still better than conventional IVF. In this review, the key techniques of NC-IVF, and risk factors affecting its pregnancy outcomes and offspring safety, as well as its prenatal outcomes were summarized starting from its definition.

【Key words】 Fertilization *in vitro*; Embryo transfer; Pregnancy outcome; Natural cycle; Modified natural cycle

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·综述·

应用基因敲除技术揭示卵巢早衰分子机制的研究进展

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13823510806

【摘要】 卵巢早衰 (premature ovarian failure, POF) 是一种以 40 岁前功能性卵泡衰竭为特征的复杂疾病。大多数 POF 病例的病因尚不清楚。近年来, 一

些突变小鼠模型表现出与人类POF相似的表型。本文综述了与原始生殖细胞形成、减数分裂、卵泡发育及原始卵泡激活相关的基因缺失导致POF的分子机制。

【关键词】 卵巢早衰； 基因敲除； 原始生殖细胞； 减数分裂； 卵泡发育

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Molecular mechanism of premature ovarian failure revealed by gene knockout

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【Abstract】 Premature ovarian failure (POF) is a complex disorder which is characterized by the depletion of functional ovarian follicles before the age of 40 years. The etiology of the most of the POF cases is unclear. In recent years, some mutant mouse models exhibit phenotypes which are comparable to human POF. In this review, we have summarized recent progress in the molecular mechanisms underlying POF caused by gene deletion related to primordial germ cell formation, meiosis, follicle development and primordial follicle activation.

【Key words】 Premature ovarian failure; Gene knockout; Primordial germ cells; Meiosis; Follicular development

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·综述·

多囊卵巢综合征及肥胖症患者的肠道菌群特征及其治疗方法

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【摘要】 不孕症的病因是多因素的, 女方原因中除输卵管因素外, 多囊卵巢综合征与肥胖也是导致不孕症发生的重要原因。近年来研究显示, 肠道菌群及其代谢物能够影响多囊卵巢综合征与肥胖的发生及发展过程, 从而在一定程度上影响女性的生殖健康。本文通过结合有关肠道菌群的近期研究, 对多囊卵巢综合征与肥胖人群肠道菌群的组成特征以及改善多囊卵巢综合征和肥胖的潜在治疗方法进行简要综述。

【关键词】 多囊卵巢综合征; 肥胖症; 肠道菌群; 益生菌; 粪便微生物移植

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Characteristics of gut microbiota in patients with polycystic ovary syndrome and obesity and its therapies

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【Abstract】 The etiology of infertility is multifactorial, in addition to fallopian tube factors, polycystic ovary syndrome (PCOS) and obesity are also important causes of infertility. As revealed by recent studies, the composition and metabolism of gut microbiota have been considered to influence the occurrence and development of PCOS and obesity, thus impairing women's reproductive health. Based on recent studies on gut microbiota, this article briefly reviews the composition characteristics of gut microbiota involved in PCOS and obese people, as well as potential treatments for PCOS and obesity.

【Key words】 Polycystic ovary syndrome; Obesity; Gut microbiota; Probiotics; Fecal microbiota transplantation

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·综述·

抗氧化制剂在男性不育中的研究概况

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【摘要】 近年来, 男性不育的研究集中在氧化应激、活性氧和抗氧化剂对生殖系统的影响。在生理情况下, 适当水平的活性氧是精子获能、顶体反应和卵子受精所必需的。活性氧的产生与清除系统失衡, 可引起精子膜脂质蛋白、核酸、线粒体 DNA 的损伤而影响精子的活力、动力及存活率从而导致不育。精子抗氧化防御水平的有限和 DNA 损伤检测及修复机制的单一, 使其非常容易受到氧化应激的影响。口服抗氧化剂被认为可以通过减少氧化损伤来改善精子质量。本文阐述了近年来国内外学者使用抗氧化剂治疗男性不育症的研究进展及前景, 希望对男性不育的治疗提供更多的思路, 解决临床治疗中的一些困惑。

【关键词】 抗氧化剂; 活性氧; 氧化应激; 男性不育

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Research progress of antioxidant therapy in male infertility

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【Abstract】 In recent years, research on male infertility has focused on the effects of oxidative stress, reactive oxygen species (ROS) and antioxidants on the reproductive system. In physiological situations, an appropriate level of reactive oxygen species is required for sperm capacitation, acrosome reaction and fertilization of the egg. The imbalance of ROS production and scavenging system affects the activity, motility and survival rate of sperm by causing damage to the protein of sperm membrane protein, nucleic acid and mitochondrial DNA, resulting in infertility. The limited level of antioxidant defense and the single mechanism of DNA damage detection and repair, sperm are very susceptible to oxidative stress. Oral antioxidants are thought to improve sperm quality by reducing oxidative damage. This review expounds the research progress and prospects of domestic and foreign scholars in the treatment of male infertility using antioxidant agents in recent years, hoping to provide more ideas for the treatment of male infertility and solve some confusions in clinical treatment.

【Key words】 Antioxidants; Reactive oxygen species; Oxidative stress; Infertility, male

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·综述·

宫腔粘连动物模型建立的研究进展

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【摘要】 宫腔粘连 (intrauterine adhesion, IUA) 是由宫腔手术操作、感染等导致宫腔部分或全部闭塞的妇科疾病。IUA 的发生机制、疾病进展过程至今尚未阐明, 具有较高的复发率、预后较差, 也缺乏有效的预防粘连的药物。IUA 动物模型的建立对揭露 IUA 的发病和药物疗效机制具有重要意义。目前用于建立模型的动物有大鼠、小鼠、兔子、犬类等, 方法包括化学法、电热损伤法、机械损伤法、机械损伤联合感染法。本文分析各模型的优缺点及对临床的模拟性, 为探讨 IUA 的发病机制、治疗策略及预防粘连等提供有效的动物模型参考。

【关键词】 宫腔粘连; 动物模型; 研究进展

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Research progress on the establishment of animal model of intrauterine adhesion

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【Abstract】 Intrauterine adhesion (IUA) is a gynecological disease caused by uterine cavity surgeries and infections that leads to partial or total occlusion of the uterine cavity. However, the underlying mechanism(s) and progression of the disease have not yet been identified. IUA has a high recurrence rate and poor

prognosis, and effective drugs to prevent adhesion are lacking. Therefore, establishing an effective animal model of IUA is of great significance for revealing the pathogenesis of IUA and the mechanism(s) governing drug effects. Rats, mice, rabbits, and other animals are currently used to establish intrauterine adhesion models. The IUA induction methods include chemical, thermal, or mechanical damage and mechanical damage combined with an infective method. We analyzed the advantages and disadvantages of various models and their clinical simulations in order to provide a precise animal model for exploring the pathogenesis, treatment strategies, and prevention of IUA.

【Key words】 Intrauterine adhesion; Animal model; Research progress

Fund program: Guangxi Traditional Chinese Medicine Suitable Technology Development and Popularization Project (GZSY21-55); Clinical Research Climbing Program of the First Affiliated Hospital of Guangxi Medical University Youth Science and Technology Star Project (YYZS2020015)