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超重或肥胖女性孕前生活方式管理指南 (2026 版)

中华护理学会妇科护理专业委员会 中国康复医学会营养与康复专业委员会 上海市护理学会妇科护理专业委员会

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【摘要】 孕前超重或肥胖不仅会增加不良妊娠结局的风险, 还会对母儿的远期健康产生不利影响。生活方式干预作为体重管理的主要干预方法之一, 近年来相关研究逐渐增加, 但国内尚无针对超重或肥胖育龄女性规范的孕前生活方式管理临床实践指南。为此, 中华护理学会妇科护理专业委员会、中国康复医学会营养与康复专业委员会和上海市护理学会妇科护理专业委员会联合发起, 遵循临床实践指南的制订方法, 形成《超重或肥胖女性孕前生活方式管理指南 (2026 版)》。本指南共涉及 30 个临床问题, 51 条推荐意见, 涵盖 6 个方面内容: ①超重/肥胖女性的诊断与评估; ②超重/肥胖女性孕前生活方式管理的目标; ③超重/肥胖女性孕前生活方式管理的内容; ④超重/肥胖女性孕前生活方式管理的行为改变技术; ⑤超重/肥胖女性孕前生活方式管理的形式; ⑥超重/肥胖女性孕前生活方式管理的周期。本指南旨在为从事超重或肥胖女性孕前生活方式管理的专业人员提供决策依据。

【关键词】 孕前保健; 超重; 肥胖; 生活方式; 体重管理; 指南

基金项目: 上海申康医院发展中心诊疗技术推广及优化管理项目 (SHDC22026302)

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Guideline for preconception lifestyle management in overweight or obese women (2026)

Gynecological Nursing Professional Committee of the Chinese Nursing Association; Nutrition and Rehabilitation Professional Committee of the Chinese Association of Rehabilitation Medicine; Gynecological Nursing Professional Committee of Shanghai Nursing Association

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【Abstract】 Preconception overweight or obesity not only increases the risk of adverse pregnancy outcomes, but also has adverse effects on the long-term health of both the mothers and their offspring. Lifestyle intervention, as one of the main intervention methods for weight management, has been increasingly studied in recent years. However, no standardized clinical practice guideline for preconception lifestyle management in overweight or obese women of childbearing age is currently available in China. To address this gap, Gynecological Nursing Professional Committee of the Chinese Nursing Association, Nutrition and Rehabilitation Professional Committee of the Chinese Association of Rehabilitation Medicine, and Gynecological Nursing Professional Committee of Shanghai Nursing Association collaboratively developed the guideline for preconception lifestyle management in overweight or obese women (2026). This guideline was developed in accordance with the standard methods for clinical practice guideline development. It encompasses 30 clinical questions and 51 recommendations, organized into 6 aspects: 1) Diagnosis and assessment of overweight/obese women; 2) Goals of preconception lifestyle management in overweight/obese women; 3) Contents of preconception lifestyle management in overweight/obese women; 4) Behavior change techniques of preconception lifestyle management in overweight/obese women; 5) Forms of preconception lifestyle management in overweight/obese women; 6) Cycles of preconception lifestyle management in overweight/obese women. The guideline aims to provide a foundation for decision-making for professionals involved in preconception lifestyle management in overweight or obese women.

【Key words】 Preconception care; Overweight; Obesity; Lifestyle; Weight management; Guideline

Fund program: Project of the Promotion and Optimization Management of Diagnostic Techniques by Shanghai Hospital Development Center (SHDC22026302)

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·生殖前沿· “十四五” 成果展·

编者按

生殖前沿是《中华生殖与避孕杂志》聚焦学科战略制高点的核心栏目，旨在搭建国家级科研项目成果展示与学术交流的平台。

“十四五”期间，国家重点研发计划等重大科研项目在配子发生调控、胚胎发育机制、母胎界面免疫、出生缺陷防控等领域取得了一系列标志性成果。值此“十五五”开局之年，本刊特推出“生殖前沿·‘十四五’成果展”栏目，系统梳理上述领域的核心突破与技术创新，记录中国生殖医学攀登科技高峰的坚实足迹，同时为“十五五”学科布局与科研选题提供前瞻参照。

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子宫内膜容受性异常与着床障碍疾病的精准诊治: 研究进展与未来方向

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【摘要】 子宫内膜容受性 (endometrial receptivity, ER) 是胚胎着床和妊娠维持的关键基础, 其异常是反复着床失败及相关生殖障碍性疾病的重要原因。然而, 人类 ER 建立的全周期动态特征、精细分子调控机制及其稳态失衡所致着床障碍的病理基础仍有待系统阐明。国家重点研发计划“子宫内膜容受性异常的精准诊治及相关着床障碍疾病防治”项目聚焦 ER 的生理调控、病理机制、精准评估与临床干预等关键环节, 综合利用细胞、类器官和动物模型, 依托反复着床失败专病队列、规范化数据库及生物样本库, 结合单细胞多组学、微生物组学、生物信息学、数据挖掘及人工智能等技术手段, 系统解析 ER 建立、维持及稳态失衡的机制, 识别中国人群相关疾病特征、风险因素及早期预警标志物, 建立并优化 ER 临床评估体系, 探索个体化干预策略, 并研发适合中国女性的 ER 评估产品。该项目构建了从基础机制解析到临床精准诊治再到产品转化应用的全链条创新体系, 为提高胚胎着床率、妊娠率及活产率, 推动着床障碍疾病精准诊治的规范化和标准化提供科技支撑。

【关键词】 子宫内膜容受性; 着床障碍; 反复种植失败; 精准诊治; 临床转化

基金项目: 国家重点研发计划 (2022YFC2702500)

Advances and future directions in the precision diagnosis and treatment of endometrial receptivity disorders and diseases associated with implantation failure

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【Abstract】 Endometrial receptivity (ER) is a fundamental prerequisite for embryo implantation and the maintenance of pregnancy, and its impairment is an

important cause of recurrent implantation failure and related reproductive disorders. However, the dynamic characteristics of ER throughout the menstrual cycle, the precise molecular mechanisms underlying its establishment and maintenance, and the pathological basis of implantation failure caused by disrupted endometrial homeostasis remain to be systematically elucidated. Centered on the National Key Research and Development Program on the precision diagnosis and treatment of abnormal endometrial receptivity and the prevention and control of diseases associated with implantation failure, this project focuses on key aspects of the physiological regulation, pathological mechanisms, precision assessment, and clinical intervention of ER. By integrating cell, organoid, and animal models with a dedicated recurrent implantation failure cohort, a standardized clinical database, and a biobank, and by combining single cell multiomics, microbiome profiling, bioinformatics, data mining, and artificial intelligence, the project aims to systematically elucidate the mechanisms underlying the establishment, maintenance, and homeostatic imbalance of ER. It further seeks to identify disease characteristics, risk factors, and early warning biomarkers in the Chinese population, establish and optimize clinical evaluation systems for ER, explore individualized intervention strategies, and develop assessment products suitable for Chinese women. Overall, the project is expected to establish a full chain innovation framework spanning basic mechanistic studies, precision clinical diagnosis and treatment, and translational product development, thereby providing scientific and technological support for improving embryo implantation, pregnancy, and live birth rates, as well as for promoting the standardization and precision management of diseases associated with implantation failure.

【 Key words 】 Endometrial receptivity; Implantation failure; Recurrent implantation failure; Precision diagnosis and treatment; Clinical translation

Fund program: National Key Research and Development Program of China (2022YFC2702500)

临床研究

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三种内膜准备方案对月经规律不孕患者首次冻融单囊胚移植助孕结局的影响

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【摘要】 目的 探讨月经规律不孕患者行首次冻融单囊胚移植周期中, 三种不同子宫内膜准备方案的助孕结局差异。方法 采用回顾性队列研究, 分析 2020 年 1 月至 2024 年 9 月在厦门大学附属妇女儿童医院妇产科学系生殖医学科首次行冻融单囊胚移植助孕、月经周期规律不孕患者 761 个周期的临床资料。按照子宫内膜准备方案分为自身黄体周期组 (303 个周期)、激素替代周期组 (194 个周期)、促性腺激素释放激素激动剂 (gonadotropin-releasing hormone agonist, GnRH-a) 降调节+激素替代周期组 (264 个周期)。主要结局指标为活产率, 次要结局指标包括患者用药情况、临床妊娠率、早期流产率、妊娠并发症和新生儿结局, 比较不同内膜准备方案组间差异。采用二元多因素 logistic 回归分析校正混杂因素分析内膜准备方案对首次冻融单囊胚移植患者活产的影响。结果 自身黄体周期组、激素替代周期组及 GnRH-a 降调节+激素替代周期组活产率分别为 59.41% (180/303)、55.67% (108/194)、61.36% (162/264), 组间差异无统计学意义 ($P=0.568$)。采用二元多因素 logistic 回归分析校正混杂因素 (男女双方年龄、不孕年限、体质质量指数、抗米勒管激素、窦卵泡计数、授精方式、移植日子宫内膜厚度) 后, 三组活产率差异仍无统计学意义 ($P>0.05$)。三组间的助孕结局 (临床妊娠率、早期流产率、多胎妊娠率、异位妊娠率)、妊娠并发症 (妊娠期高血压、妊娠期糖尿病) 和新生儿结局 (早产率、剖宫产率、新生儿体质量等) 差异均无统计学意义 (均 $P>0.05$)。自身黄体周期方案组用药总时间 [(47.28 ± 21.93) d] 明显少于激素替代周期组 [(65.86 ± 25.25) d] 和 GnRH-a 降调节+激素替代周期组 [(97.00 ± 24.23) d], 单用孕激素黄体支持占比 [74.59% (226/303)] 明显高于激素替代周期组 (0%) 和 GnRH-a 降调节+激素替代周期组 (0%), 差异均有统计学意义 (均 $P<0.001$)。结论 三种内膜准备方案在月经周期规律不孕患者冻融单囊胚移植周期的活产率相似, 自身黄体周期子宫内膜准备方案进行冻融胚胎移植周期仅需简单的黄体支持, 用药时间短且用药剂量少, 是月经规律不孕患者子宫内膜准备的首选方案。

【关键词】 子宫内膜; 囊胚; 活产; 冻融胚胎移植

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Effects of three endometrial preparation protocols on pregnancy outcomes following the first frozen-thawed single blastocyst transfer in infertile patients with regular menstruation

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【 Abstract 】 Objective To investigate the differences in assisted reproductive outcomes among three different endometrial preparation protocols in

infertile women with regular menstrual cycles undergoing their first frozen-thawed single blastocyst transfer (FET-SBT) cycle. **Methods** This retrospective cohort study analyzed clinical data from 761 cycles of infertile patients with regular menstrual cycles who underwent their first FET-SBT at the Department of Reproductive Medicine, Department of Obstetrics and Gynecology of the Affiliated Women and Children's Hospital of Xiamen University between January 2020 and September 2024. Patients were divided into three groups according to the endometrial preparation protocol: the natural cycle with endogenous corpus luteum group (natural luteal phase protocol group, $n=303$), the hormone replacement therapy cycle group (HRT group, $n=194$), and the gonadotropin-releasing hormone agonist (GnRH-a) down-regulation combined with HRT cycle group (GnRH-a+HRT group, $n=264$). The primary outcome measure was the live birth rate. Secondary outcome measures included medication regimens among patients, clinical pregnancy rate, early miscarriage rate, pregnancy complications, and neonatal outcomes, aiming to compare intergroup differences among different endometrial preparation protocols. Binary multivariate logistic regression analysis was used to adjust for confounding factors and to evaluate the effect of endometrial preparation protocols on live birth in patients undergoing their first FET-SBT. **Results** The live birth rates in the natural luteal phase protocol group, HRT, and GnRH-a+HRT groups were 59.41% (180/303), 55.67% (108/194), and 61.36% (162/264), respectively, with no statistically significant difference among the three groups ($P=0.568$). After adjusting for confounding factors (both partners' age, duration of infertility, body mass index, anti-Müllerian hormone, antral follicle count, fertilization method, endometrial thickness on the day of transfer) using binary multivariate logistic regression analysis, the live birth rates remained comparable among the three groups ($P>0.05$). No statistically significant differences were observed in assisted reproductive outcomes (clinical pregnancy rate, early miscarriage rate, multiple pregnancy rate, ectopic pregnancy rate), pregnancy complications (gestational hypertension, gestational diabetes mellitus) or maternal-neonatal outcomes (preterm birth rate, cesarean section rate, neonatal birth weight, etc, all $P>0.05$). The total duration of medication in the natural luteal phase protocol group [(47.28 $\pm$ 21.93) d] was significantly shorter than that in the HRT group [(65.86 $\pm$ 25.25) d] and the GnRH-a+HRT group [(97.00 $\pm$ 24.23) d]. The proportion of cycles using progesterone alone for luteal support was 74.59% (226/303) in the natural luteal phase protocol group, which was significantly higher than that in the HRT group (0%) and the GnRH-a+HRT group (0%). All differences were statistically significant (all $P<0.001$). **Conclusion** The three endometrial preparation protocols achieved comparable live birth rates in women with regular menstrual cycles undergoing FET-SBT. The natural cycle protocol with an endogenous corpus luteum required simpler luteal support, with a shorter medication duration and a lower medication dosage, making it the preferred choice for endometrial preparation in infertile patients with regular menstrual cycles.

【Key words】 Endometrium; Blastula; Live birth; Frozen-thawed embryo transfer

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NF- κ B/FoxO3a 通路介导 M2 型巨噬细胞极化异常在 PCOS 大鼠卵巢炎症中的作用

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【摘要】 目的 探讨核因子- κ B (nuclear factor-kappa B, NF- κ B) / 叉头框蛋白 O3a (forkhead box protein O3a, FoxO3a) 信号通路对多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 大鼠卵巢组织中 M2 型巨噬细胞极化的调控作用。方法 SD 大鼠按随机数字表法随机分为对照组和 PCOS 组, 每组 6 只, 适应性饲养 1 周后, PCOS 组大鼠以来曲唑连续灌胃 21 d 构建 PCOS 模型, 对照组大鼠每天灌胃等体积 1% 羧甲基纤维素钠, 持续 21 d。采用苏木精-伊红染色观察卵巢组织形态; 检测空腹血糖 (fasting plasma glucose, FPG)、空腹胰岛素 (fasting insulin, FINS) 并计算稳态模型评估胰岛素抵抗指数 (homeostasis model assessment of insulin resistance, HOMA-IR); 酶联免疫吸附法 (enzyme-linked immunosorbent assay, ELISA) 测定血清中黄体生成素 (luteinizing hormone, LH)、卵泡刺激素 (follicle-stimulating hormone, FSH)、睾酮、白细胞介素 (interleukin, IL)-1 β 、IL-6、IL-10 及肿瘤坏死因子- α (tumor necrosis factor- α , TNF- α) 水平, 并计算 LH/FSH 比值; 蛋白免疫印迹法和实时荧光定量聚合酶链式反应检测卵巢组织中 NF- κ B p65、FoxO3a、Arg-1 和 CD206 的蛋白及 mRNA 表达; 同时使用免疫组织化学法和免疫荧光染色双标法检测 M1 型和 M2 型巨噬细胞定位与分布; 流式细胞仪检测外周血中 M1 型和 M2 型巨噬细胞比例, 并计算 M1/M2 型巨噬细胞比例; 采用 Pearson 相关分析法, 评估 M2 型巨噬细胞与性激素、

炎症因子、HOMA-IR、NF- κ B p65 及 FoxO3a 表达的相关性。结果 PCOS 组大鼠卵巢组织出现多个囊性扩张卵泡，颗粒细胞层数减少、排列松散，部分卵泡闭锁；血清 LH、睾酮、LH/FSH、IL-1 β 、IL-6、TNF- α 、FINS 及 HOMA-IR 水平均高于对照组 ($P=0.003$ 、 $P<0.001$ 、 $P=0.004$ 、 $P<0.001$ 、 $P<0.001$ 、 $P<0.001$ 、 $P<0.001$)，而 FSH、FPG 和 IL-10 水平均低于对照组 ($P=0.008$ 、 $P=0.026$ 、 $P<0.001$)。PCOS 组卵巢组织中 NF- κ B p65 和 FoxO3a 蛋白及 mRNA 表达较对照组均上升 ($P=0.017$ 、 $P=0.001$ 、 $P=0.002$ 、 $P=0.001$)，Arg-1 和 CD206 蛋白及 mRNA 表达较对照组均下降 ($P=0.005$ 、 $P=0.001$ 、 $P=0.004$ 、 $P=0.019$)。免疫组织化学法显示，PCOS 组大鼠卵巢间质及闭锁卵泡周围 M1 型巨噬细胞浸润增多，生长卵泡与黄体区域 M2 型巨噬细胞减少。免疫荧光染色双标法显示，与对照组相比，PCOS 组大鼠卵巢组织中 CD86⁺/CD68⁺ 荧光比值明显升高，CD206⁺/CD68⁺ 荧光比值明显降低 (均 $P<0.001$)，M1/M2 比例升高 ($P=0.001$)。流式细胞检测结果显示，与对照组相比，PCOS 组大鼠外周血中 M1 型巨噬细胞比例 [(2.066 $\pm$ 0.056)% 比 (0.543 $\pm$ 0.021)%， $P<0.001$] 显著升高，M2 型巨噬细胞比例 [(0.673 $\pm$ 0.015)% 比 (0.613 $\pm$ 0.006)%] 略有升高，但差异无统计学意义 ($P=0.084$)，M1/M2 型巨噬细胞比例 (3.070 $\pm$ 0.068 比 0.886 $\pm$ 0.028， $P<0.001$) 显著升高。相关性分析提示，CD206 的表达与 LH、LH/FSH、IL-1 β 、IL-6、TNF- α 、HOMA-IR、FoxO3a 水平呈负相关 ($r=-0.86$ ， $P=0.006$ ； $r=-0.91$ ， $P=0.002$ ； $r=-0.86$ ， $P=0.007$ ； $r=-0.86$ ， $P=0.006$ ； $r=-0.89$ ， $P=0.003$ ； $r=-0.84$ ， $P=0.009$ ； $r=-0.74$ ， $P=0.038$)，与 FSH 和 IL-10 水平呈正相关 ($r=0.90$ ， $P=0.002$ ； $r=0.83$ ， $P=0.010$)；NF- κ B p65 与 FoxO3a 表达呈正相关 ($r=0.88$ ， $P=0.004$)。结论 NF- κ B/FoxO3a 信号通路上调可能抑制 M2 型巨噬细胞极化，加剧卵巢局部炎症反应，参与 PCOS 的发病机制。

【关键词】 多囊卵巢综合征； 核因子- κ B； 叉头框蛋白 O3a； 巨噬细胞

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Role of the NF- κ B/FoxO3a pathway in mediating abnormal M2 macrophage polarization in ovarian inflammation in polycystic ovary syndrome rats

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【Abstract】 **Objective** To investigate the regulatory role of the nuclear factor-kappa B (NF- κ B)/Forkhead box protein O3a (FoxO3a) signaling pathway on M2-type macrophage polarization in the ovarian tissue of rats with polycystic ovary syndrome (PCOS). **Methods** SD rats were randomly divided into control group ($n=6$) and PCOS group ($n=6$) using a random number table method. The PCOS model was established by continuous intragastric administration of letrozole for 21 d. The rats in control group were administered an equal volume of 1% carboxymethyl cellulose sodium via oral gavage daily for 21 d. Ovarian tissue

morphology was observed using hematoxylin and eosin (HE) staining. Fasting plasma glucose (FPG) and fasting insulin (FINS) levels were measured, and the homeostasis model assessment of insulin resistance (HOMA-IR) was calculated. Serum levels of luteinizing hormone (LH), follicle-stimulating hormone (FSH), testosterone, interleukin (IL)-1 β , IL-6, IL-10, and tumor necrosis factor- α (TNF- α) were determined using enzyme-linked immunosorbent assay (ELISA), and the LH/FSH ratio was calculated. The protein and mRNA expression levels of NF- κ B p65, FoxO3a, Arg-1, and CD206 in ovarian tissue were detected by Western blotting and real-time quantitative polymerase chain reaction (qPCR). The localization and distribution of M1 and M2 macrophages were assessed using immunohistochemistry and immunofluorescence double staining. The proportions of M1 and M2 macrophages in peripheral blood were measured by flow cytometry, and the M1/M2 macrophage ratio was calculated. Finally, Pearson correlation analysis was used to assess the correlations between M2 macrophages and sex hormones, inflammatory factors, HOMA-IR, and the expression of NF- κ B p65, and FoxO3.

Results In the PCOS group, multiple cystic dilated follicles were observed in the ovarian tissue, with a reduced number of granulosa cell layers that were loosely arranged, along with follicular atresia in some follicles. Serum levels of LH, testosterone, LH/FSH, IL-1 β , IL-6, TNF- α , FINS, and HOMA-IR in the PCOS group were all elevated ($P=0.003$, $P<0.001$, $P=0.004$, $P<0.001$, $P<0.001$, $P<0.001$, $P<0.001$, $P<0.001$), whereas levels of FSH, FPG, and IL-10 were decreased compared with control group ($P=0.008$, $P=0.026$, $P<0.001$). The protein and mRNA expression levels of NF- κ B p65 and FoxO3a in ovarian tissue were upregulated in the PCOS group compared with control group ($P=0.017$, $P=0.001$, $P=0.002$, $P=0.001$), while those of Arg-1 and CD206 were downregulated ($P=0.005$, $P=0.001$, $P=0.004$, $P=0.019$). Immunohistochemistry showed that in the PCOS group, M1 macrophages infiltration was increased in the ovarian stroma and around atretic follicles, while M2 macrophages were decreased in the growing follicles and corpora lutea. Compared with control group, the fluorescence ratio of CD86 $^{+}$ /CD68 $^{+}$ was significantly increased, while the ratio of CD206 $^{+}$ /CD68 $^{+}$ was markedly decreased (all $P<0.001$) and M1/M2 ratio was elevated ($P=0.001$) in rat ovarian tissues of the PCOS group. Flow cytometry results revealed that, compared with control group, the proportion of M1 macrophages in peripheral blood of PCOS rats [(2.066 $\pm$ 0.056)% vs. (0.543 $\pm$ 0.021)%, $P<0.001$] was significantly increased, while the proportion of M2 macrophages [(0.673 $\pm$ 0.015)% vs. (0.613 $\pm$ 0.006)%] was slightly increased but without statistical significance ($P=0.084$). The M1/M2 macrophage ratio was significantly elevated in the PCOS group compared with control group (3.070 $\pm$ 0.068 vs. 0.886 $\pm$ 0.028, $P<0.001$). Correlation analysis indicated that CD206 expression was negatively correlated with LH, LH/FSH, IL-1 β , IL-6, TNF- α , HOMA-IR, and FoxO3a levels ($r=-0.86$, $P=0.006$; $r=-0.91$, $P=0.002$; $r=-0.86$, $P=0.007$; $r=-0.86$, $P=0.006$; $r=-0.89$, $P=0.003$; $r=-0.84$, $P=0.009$; $r=-0.74$, $P=0.038$), and positively correlated with FSH and IL-10 levels ($r=0.90$, $P=0.002$; $r=0.83$, $P=0.010$). NF- κ B p65 expression was positively correlated with FoxO3a expression ($r=0.88$, $P=0.004$).

Conclusion Upregulation of the NF- κ B/FoxO3a

signaling pathway may inhibit M2 macrophage polarization, exacerbate the local inflammatory response in the ovary, and contribute to the pathogenesis of PCOS.

【Key words】 Polycystic ovary syndrome; NF- κ B; FoxO3a; Macrophage

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利多卡因扩张棒对静脉麻醉人工流产术后镇痛作用的随机对照研究

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【摘要】 目的 探讨利多卡因扩张棒对静脉麻醉人工流产术后的镇痛效果及应用价值, 为术后疼痛管理提供新方案。方法 采用随机对照试验设计, 纳入2025年7月1日至7月20日在复旦大学附属妇产科医院计划生育科因非意愿妊娠, 孕周 ≤ 10 周而要求行静脉麻醉人工流产术的120例患者, 采用随机数字表法1:1随机分为试验组(60例)与对照组(60例)。试验组在手术结束后将含利多卡因[(20 $\pm$ 3) mg]的宫颈扩张棒置于宫颈口留置5 min, 对照组采用不含利多卡因的宫颈扩张棒, 以相同方式置于宫颈口留置5 min。以术后15 min、30 min、1 h、2 h的视觉模拟评分(visual analogue scale, VAS)为主要观察指标, 额外止痛药使用率及不良反应发生率为次要指标, 采用Mann-Whitney U 检验对比两组术后15 min、30 min、1 h、2 h的VAS, 采用Fisher精确检验比较两组术后2 h内额外止痛药使用率。结果 患者年龄、体质量指数、孕周、孕次、产次等基线资料组间比较, 差异均无统计学意义(均 $P>0.05$), 具有可比性。试验组术后15 min、30 min、2 h的VAS [1.50 (0.00, 3.00) 分、1.00 (0.00, 3.00) 分、0.00 (0.00, 1.00) 分] 均显著低于对照组 [3.00 (1.25, 4.00) 分, $P=0.029$; 3.00 (2.00, 3.00) 分, $P=0.014$; 1.00 (0.00, 2.00) 分, $P=0.002$], 且试验组术后30 min、1 h、2 h的VAS均显著低于术前痛经基线($P=0.017$ 、 $P=0.001$ 、 $P<0.001$), 对照组术后15 min、30 min的VAS显著高于术前痛经基线(均 $P<0.001$); 试验组与对照组术后2 h内额外止痛药使用率分别为5.0% (3/60)、3.3% (2/60), 差异无统计学意义($P>0.999$); 术后2 h内, 仅试验组发生1例呕吐, 发生率为1.7%, 两组不良反应发生率差异无统计学意义($P>0.999$)。结论 利多卡因扩张棒可显

著降低静脉麻醉人工流产术后的 VAS, 且安全性良好, 为静脉麻醉人工流产术后镇痛提供了有效且便捷的临床方案。

【关键词】 静脉麻醉; 人工流产; 术后镇痛; 视觉模拟评分法; 利多卡因扩张棒; 镇痛效果

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A randomized controlled study of lidocaine-containing cervical dilator for postoperative analgesia after intravenous anesthesia abortion

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【Abstract】 Objective To investigate the analgesic effect and clinical value of lidocaine-containing cervical dilator for postoperative pain relief after induced abortion under intravenous anesthesia, and to provide a novel strategy for postoperative pain management. **Methods** A randomized controlled trial was conducted. A total of 120 patients who underwent induced abortion under intravenous anesthesia (gestational age ≤ 10 weeks) at the Family Planning Department, the Obstetrics & Gynecology Hospital of Fudan University from July 1 to July 20, 2025 were enrolled and randomly divided into the experimental group ($n=60$) and control group ($n=60$) in a 1 : 1 ratio using a random number table method. In the experimental group, a cervical dilator containing lidocaine $[(20\pm 3)$ mg] was placed at the cervical os and retained for 5 min after the completion of surgery. In control group, a lidocaine-free cervical dilator was placed at the cervical os in the same manner and retained for 5 min. The visual analogue scale (VAS) at 15 min, 30 min, 1 h and 2 h postoperatively were set as the primary outcome measures. The utilization rate of rescue analgesics and the incidence of adverse reactions were set as secondary outcome measures. The Mann-Whitney U test was used to compare VAS between the two groups at 15 min, 30 min, 1 h and 2 h postoperatively. The Fisher's exact test was used to compare the utilization rate of rescue analgesics within 2 h after surgery between the two groups. **Results** There were no statistically significant differences in baseline data such as age, body mass index, gestational age, gravidity and parity between the two groups (all $P>0.05$), indicating comparability. The VAS in the experimental group at 15 min, 30 min and 2 h postoperatively were $[1.50 (0.00, 3.00)$ points, $1.00 (0.00, 3.00)$ points, $0.00 (0.00, 1.00)$ points], which were significantly lower than those in control group $[3.00 (1.25, 4.00)$ points, $P=0.029$; $3.00 (2.00, 3.00)$ points, $P=0.014$; $1.00 (0.00, 2.00)$ points, $P=0.002$]. Moreover, the VAS in the experimental group at 30 min, 1 h and 2 h postoperatively were significantly lower than the baseline dysmenorrhea VAS before surgery ($P=0.017$, $P=0.001$, $P<0.001$, respectively). The utilization rates of rescue analgesics within 2 h after surgery were 5.0% (3/60) in the experimental group and 3.3% (2/60) in control group, with no statistically significant difference ($P>0.999$). Only 1 case of vomiting occurred in the experimental group within 2 h after surgery, with an incidence of 1.7%, and there was no significant difference in

the incidence of adverse reactions between the two groups ($P>0.999$). **Conclusion** Lidocaine-containing cervical dilator can significantly reduce postoperative VAS after induced abortion under intravenous anesthesia, with favorable safety profile. It provides an effective and convenient clinical strategy for postoperative analgesia in patients undergoing artificial abortion under intravenous anesthesia.

【Key words】 Intravenous anesthesia; Induced abortion; Postoperative analgesia; Visual analogue scale; Lidocaine dilator stick; Analgesic effect

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·现场调查·

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性别与不孕/不育症患者心理健康的关联: 压力感知的统计学中介作用

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【摘要】 目的 探讨不孕/不育症患者心理特征的性别差异, 分析感知压力的影响因素, 评估感知压力在性别与焦虑、抑郁之间的中介作用。方法 本研究为横断面研究, 于 2025 年 2 月至 10 月在首都医科大学附属北京朝阳医院生殖医学中心采用便利抽样法招募不孕/不育症患者。使用自编问卷收集社会人口学信息, 采用广泛性焦虑量表 (Generalized Anxiety Disorder-7, GAD-7)、患者健康问卷抑郁量表 (Patient Health Questionnaire-9, PHQ-9) 及 4 项感知压力量表 (Perceived Stress Scale-4, PSS-4) 分别评估焦虑、抑郁与感知压力。采用单因素及多因素 logistic 回归分析感知压力的影响因素, 使用 R 软件 mediation 包检验中介效应, 模型调整了年龄、治疗阶段及社会人口学特征 (教育、收入、婚姻、职业) 等协变量。结果 共纳入有效样本 1 065 例, 其中女性 768 例 (72.11%), 男性 297 例 (27.89%)。女性的焦虑 [4.00 (1.00, 7.00) 分]、抑郁 [2.00 (0.00, 5.00) 分] 及感知压力 [5.00 (2.00, 8.00) 分] 得分均显著高于男性 [1.00 (0.00, 4.00) 分、1.00 (0.00, 3.00) 分、3.00 (1.00, 7.00) 分, 均 $P<0.001$]。多因素 logistic 回归分析提示, 年龄 ($OR=0.967$, 95% CI : 0.942~0.993, $P=0.012$) 与性别 ($OR=1.521$, 95% CI : 1.135~2.039, $P=0.005$) 为感知压力的独立影响因素。中介效应分析中, 感知压力在性别影响焦虑与抑郁中的间接效应分别为 0.416 (95% CI : 0.180~0.666, $P=0.001$) 和 0.398 (95% CI : 0.172~0.634, $P<0.001$), 中介

比例分别为 19.17% (0.416/2.170) 和 29.97% (0.398/1.328)。结论 在不孕/不育症患者中, 女性的焦虑与抑郁水平均显著高于男性。感知压力在性别影响焦虑与抑郁的过程中发挥部分中介作用, 部分解释了性别所致心理困扰。

【关键词】 焦虑; 抑郁; 不孕/不育症; 心理健康; 感知压力

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Association between gender and mental health in infertility patients: the statistical mediating role of perceived stress

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【Abstract】 Objective To explore gender differences in psychological characteristics among infertility patients, analyze factors influencing perceived stress, and evaluate the mediating role of perceived stress between gender and anxiety/depression. **Methods** A cross-sectional study design was employed. Infertility patients were recruited via convenience sampling at the Medical Center for Human Reproduction of Beijing Chao-Yang Hospital, Capital Medical University, from February to October 2025. A self-designed questionnaire collected sociodemographic information, while Generalized Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9), and Perceived Stress Scale-4 (PSS-4) assessed anxiety, depression, and perceived stress, respectively. Univariate and multivariate logistic regression analyzed factors influencing perceived stress; the mediation effect was tested using the mediation package in R software, adjusting for covariates including age, treatment stage, and sociodemographic characteristics (education, income, marital status, and occupation). **Results** A total of 1 065 valid cases were included, with 768 females (72.11%) and 297 males (27.89%). Women exhibited significantly higher scores in anxiety [4.00 (1.00, 7.00)], depression [2.00 (0.00, 5.00)], and perceived stress [5.00 (2.00, 8.00)] compared with men [1.00 (0.00, 4.00), 1.00 (0.00, 3.00), 3.00 (1.00, 7.00), all $P<0.001$]. Multivariate logistic regression analysis indicated that age ($OR=0.967$, 95% CI : 0.942–0.993, $P=0.012$) and gender ($OR=1.521$, 95% CI : 1.135–2.039, $P=0.005$) were independent predictors of perceived stress. In mediation analysis, the indirect effects of perceived stress in mediating gender's influence on anxiety and depression were 0.416 (95% CI : 0.180–0.666, $P=0.001$) and 0.398 (95% CI : 0.172–0.634, $P<0.001$), respectively, with mediation proportions of 19.17% (0.416/2.170) and 29.97% (0.398/1.328), respectively. **Conclusion** Female infertility patients exhibited significantly higher levels of anxiety and depression compared with males. Perceived stress partially mediates the influence of gender on anxiety and depression, explaining part of the gender-related psychological distress.

【Key words】 Anxiety; Depression; Infertility; Mental health; Perceived stress

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个案报道

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新发 Y 染色体 AZFc 区缺失导致非梗阻性无精子症 1 例患者遗传学分析与临床决策

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【摘要】 本文报道 1 例新发 Y 染色体无精子因子 c (azoospermia factor c, AZFc) 区缺失导致非梗阻性无精子症 (nonobstructive azoospermia, NOA) 患者。经遗传学分析, 该病例核型为 46,X,inv (Y) (p11.2q11.22), 染色体拷贝数变异 (copy number variation sequencing, CNV-seq) 结果为 seq [hg19] del (Y) (q11.221q11.223) chrY: g.19580000_24520000del, Y 染色体微缺失检测提示 AZFc 区完全缺失 (sY160 存在), 最终确诊该患者分子核型为 46,X,der (Y) inv (Y) (p11.2q11.22).seq [hg19] del (Y) (q11.221q11.223) chrY: g.19580000_24520000del。其父亲验证核型为正常男性, 该患者为新发变异。本案例表明, 细胞与分子遗传学技术的联合应用可为确诊 NOA 患者病因提供可信的技术平台, 为辅助生殖技术中的临床决策与遗传风险评估提供依据。

【关键词】 Y 染色体微缺失; 非梗阻性无精子症; 临床决策; Y 染色体倒位

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Genetic analysis and clinical decision-making of a patient with nonobstructive azoospermia caused by a newly discovered Y chromosome AZFc region deletion

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【Abstract】 This article reports a case of nonobstructive azoospermia (NOA) caused by a newly discovered Y chromosome azoospermia factor c (AZFc) region deletion. Genetic analysis showed that the case had a karyotype of 46,X,inv(Y)(p11.2q11.22). The result of chromosome copy number variation sequencing (CNV-seq) is seq[hg19] del(Y)(q11.221q11.223) chrY:g.19580000_24520000del. Y chromosome microdeletion detection suggests complete deletion of AZFc region (sY160 exists), and the final diagnosis of the patient's molecular karyotype is 46,X,der(Y)inv(Y)(p11.2q11.22).seq[hg19] del(Y)(q11.221q11.223) chrY:g.19580000_24520000del. It was verified that his father's karyotype is normal, and the patient has a newly developed variant. This case demonstrates that the combined application of cytogenetic and molecular genetic techniques provides a reliable platform for identifying the etiology in NOA patients, offering a basis for clinical decision-making and genetic risk assessment in assisted reproductive technology.

【Key words】 Y chromosome microdeletion; Azoospermia, nonobstructive; Clinical decision-making; Y chromosome inversion

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专家视角

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产科抗磷脂综合征的发病机制与治疗策略

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【摘要】 产科抗磷脂综合征 (obstetric antiphospholipid syndrome, OAPS) 是一种以多种病理妊娠事件作为临床表现的自身免疫性疾病, 严重危害妊娠期女性生育健康。长期以来, 学术界对 OAPS 的异质性缺乏深入认识, 全孕期低分子肝素联合小剂量阿司匹林被视为标准治疗方案。然而, 很大一部分 OAPS 患者接受标准治疗后仍发生病理妊娠事件, 尚无公认的治疗策略, 可见探索新机制与新疗法的紧迫性。母胎界面是妊娠建立与维持的结构基础, 其发育过程及微环境稳态是解析 OAPS 发病机制的重要切入点。本文基于母胎界面微血栓形成与发育异常的双重视角, 阐述目前 OAPS 发病机制与治疗策略的研究进展, 以期为该疾病的临床管理及未来研究提供参考与借鉴。

【关键词】 抗体, 抗磷脂; 产科抗磷脂综合征; 凝血; 母胎界面; 免疫调节

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Pathogenesis and treatment strategies of obstetric antiphospholipid syndrome

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【Abstract】 Obstetric antiphospholipid syndrome (OAPS) is an autoimmune disease characterized by various pathological pregnancy events, seriously threatening the reproductive health of women of pregnancy period. For a long time, the academic community has lacked in-depth understanding of the heterogeneity of OAPS, and administration of low molecular weight heparin combined with low-dose aspirin throughout pregnancy has been regarded as the standard therapeutic regimen. However, a substantial proportion of OAPS patients still experience pathological pregnancy events despite standard treatment, and no consensus treatment strategies exist, highlighting the urgency of exploring novel mechanisms and therapies. The maternal-fetal interface serves as the structural foundation for the establishment and maintenance of pregnancy, and its developmental processes and microenvironmental homeostasis provide important entry points for dissecting the pathogenesis of OAPS. Based on the dual perspective of micro-thrombosis and developmental abnormalities at the maternal-fetal interface, this article elaborates on current research advances regarding the pathogenic mechanisms and treatment strategies of OAPS, aiming to provide reference for clinical management and future research of this disease.

【Key words】 Antibodies, antiphospholipid; Obstetric antiphospholipid syndrome; Coagulation; Maternal-fetal interface; Immune regulation

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综述

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多囊卵巢综合征与甲状腺自身免疫的研究进展

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【摘要】 多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 是一种常见的妇科内分泌疾病, 以月经失调、雄激素过多和卵巢多囊样改变为特征。既往研究显示, PCOS 患者中甲状腺自身免疫 (thyroid autoimmunity, TAI) 的发生率显著高于普通人群, PCOS 和 TAI 在免疫、遗传等方面存在共享的发病机制, 对育龄期女性的胚胎发育、妊娠结局、新生儿结局和远期健康等方面存在潜在影响。本文结合文献, 旨在探讨 PCOS 和 TAI 的相互作用机制及 TAI 对 PCOS 患者的影响, 并总结治疗与临床管理策略, 强调早期筛查和个体化治疗的重要性。

【关键词】 多囊卵巢综合征; 甲状腺自身免疫; 甲状腺自身抗体

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Research advances in polycystic ovary syndrome and thyroid autoimmunity

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【Abstract】 Polycystic ovary syndrome (PCOS) is a common gynecological endocrine disorder characterized by menstrual irregularities, hyperandrogenism, and polycystic ovarian morphology. Previous studies have shown that the prevalence of thyroid autoimmunity (TAI) in women with PCOS is significantly higher than that in the general population, and that PCOS and TAI share common pathogenic pathways in terms of immunology, genetics, and other factors, with potential impacts on embryonic development, pregnancy outcomes, neonatal outcomes, and long-term health in women. This review aims to synthesize the existing literature, explore the interaction mechanisms between PCOS and TAI, summarize the effects of TAI on patients with PCOS, and outline treatment and clinical management strategies, highlighting the importance of early screening and personalized treatment.

【Key words】 Polycystic ovary syndrome; Thyroid autoimmunity; Thyroid autoantibodies

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大气污染物、气象因子及其交互作用对辅助生殖助孕结局影响的研究进展

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【摘要】 随着工业化与城市化进程加速, 大气污染物排放持续增加, 全球气候变化加剧, 导致气象因子出现异常波动。这两类环境问题交织叠加, 已成为重大公共卫生挑战, 不仅持续威胁人类生殖健康, 也对辅助生殖技术的助孕结局产生一定影响。本文系统探讨大气污染物、气象因子及其交互作用对辅助生殖各环节的影响, 深入分析其通过氧化应激、表观遗传等途径作用的生物学机制, 并评估环境风险干预策略的有效性, 旨在为临床实践提供环境风险管理的科学依据, 并为优化辅助生殖结局、提升育龄人群的生殖健康保障水平提供理论参考。

【关键词】 生殖技术, 辅助; 空气污染; 气象因子; 妊娠结局

Impact of air pollutants, meteorological factors and their interactions on outcomes of assisted reproductive technology

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【Abstract】 With the acceleration of industrialization and urbanization, atmospheric pollutant emissions continue to rise, and global climate change intensifies, leading to abnormal fluctuations in meteorological factors. The convergence of these two environmental issues has become a major public health challenge, posing not only ongoing threats to human reproductive health but also significantly affecting the outcomes of assisted reproductive technology. This review systematically examines the impact of atmospheric pollutants and meteorological factors, as well as their interactions, on various stages of assisted reproduction. It delves into the biological mechanisms underlying these effects,

such as oxidative stress and epigenetic pathways, and evaluates the effectiveness of environmental risk intervention strategies. By providing a scientific basis for environmental risk management in clinical practice, this review aims to optimize ART outcomes and offer theoretical guidance for enhancing reproductive health protection among individuals of childbearing age.

【 Key words 】 Reproductive techniques, assisted; Air pollution; Meteorological factors; Pregnancy outcome

综述

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细胞器互作网络失调与不孕不育相关性的研究进展

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【摘要】 不孕不育作为全球性健康问题, 其病因涉及遗传、环境、代谢等多方面因素。近年来有研究表明, 细胞器互作网络失调在其发生机制中具有重要作用。生殖细胞发育及生殖过程依赖于线粒体、内质网等细胞器通过膜接触位点与囊泡运输形成的动态协作, 该网络失调可能导致生育障碍。本文对细胞器互作网络失调在不孕不育中的潜在机制及相关诊疗现状进行综述, 以期对未来研究方向与临床实践提供参考。

【关键词】 不孕; 不育; 细胞器互作网络失调; 病理机制; 诊疗进展

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Research advances on the correlation between dysregulation of organelle interaction networks and infertility

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【Abstract】 Infertility, as a global health issue, involves multiple etiological factors including genetic, environmental, and metabolic elements. Recent studies have revealed that dysregulation of the interorganelle interaction network plays a significant role in its pathogenesis. The development of germ cells and the reproductive process depend on dynamic coordination among organelles such as mitochondria and the endoplasmic reticulum, which is mediated through membrane contact sites and vesicular trafficking. Dysfunction of this network may contribute to fertility disorders. This article reviews the potential mechanisms underlying interorganelle interaction network dysregulation in infertility and the current status of related diagnosis and treatment, aiming to provide insights for future research directions and clinical practice.

【Key words】 Infertility, female; Infertility, male; Dysregulation of organelle interaction networks; Pathological mechanisms; Advances in diagnosis and treatment

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卵巢组织玻璃化冷冻保护剂的研究进展

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【摘要】 恶性肿瘤诊疗技术的发展提升了青少年及年轻患者的长期生存率, 但其接受的放化疗存在生殖毒性, 对于年轻的女性患者易引发卵泡闭锁、卵巢基质纤维化, 最终导致不可逆的卵巢功能衰竭, 生育力保存成为改善该群体生存质量的关键。卵巢组织冷冻保存是青春期前女性、激素敏感性肿瘤患者唯一可行的生育力保存方式, 玻璃化冷冻因操作简便、冰晶损伤少成为研究热点, 其核心挑战为冷冻保护剂需平衡玻璃化效果与组织毒性、残留风险。本文聚焦卵巢组织玻璃化冷冻中冷冻保护剂的优化策略, 综述渗透与非渗透性冷冻保护剂的单组分特性及协同作用机制, 对比人类与非人灵长类动物模型中不同冷冻保护剂方案的应用效能, 同时分析活性氧蓄积、物种特异性适配差异等安全性风险, 并探讨对应的防控措施。

【关键词】 玻璃化冷冻; 生育力保存; 卵巢组织; 玻璃化冷冻保护剂; 卵巢功能保护

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Research progress on vitrification cryoprotectants for ovarian tissue

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【Abstract】 With the continuous advancement of diagnosis and treatment technologies for malignant tumors, the long-term survival rate of adolescent and young female patients has been significantly improved. However, the reproductive toxicity caused by radiotherapy and chemotherapy easily induces accelerated follicular atresia and ovarian stromal fibrosis, ultimately leading to irreversible ovarian failure, thus making fertility preservation a crucial requirement for enhancing the quality of life in this population. Ovarian tissue cryopreservation is the only feasible fertility preservation option for prepubertal females and patients with hormone-sensitive tumors. Among cryopreservation methods, vitrification has become a research hotspot due to its simple operation and minimal ice crystal damage, and its core challenge is to balance the vitrification efficacy of cryoprotective agents (CPAs) with the reduction of their tissue toxicity and residual risks. This paper focuses on the optimization strategies of CPAs for ovarian tissue vitrification, systematically reviewing the individual characteristics and synergistic mechanisms of permeating CPAs and non-permeating CPAs. It also compares the efficacy of different CPAs protocols in human and non-human primate models, and further analyzes potential safety risks including reactive oxygen species accumulation and species-specific adaptation differences, as well as the corresponding targeted prevention and control measures.

【 Key words 】 Vitrification; Fertility preservation; Ovarian tissue; Vitrification cryoprotectant; Ovarian function protection

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卵泡液多组学研究进展与生殖医学应用

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【摘要】 在辅助生殖技术 (assisted reproductive technology, ART) 中, 卵母细胞质量及其所影响的胚胎发育潜能, 是决定其临床结局的重要因素。作为卵母细胞发育的核心微环境, 卵泡液对于反映卵泡代谢、卵母细胞衰老以及核心信号通路转导等过程具有重要的作用。随着代谢组、蛋白组等多组学技术的不断发展, 卵泡液的多组学分析也为了解卵母细胞的生长状态、能量代谢水平、氧化应激调控和胚胎发育潜能提供了新的窗口, 同时在不孕症患者的诊疗中, 有助于指导个体化促排卵、囊胚培养优化以及精细化 ART 策略。然而目前也面临着样本有限, 成本高等问题, 未来需强化多中心研究、降低检测成本, 促进人工智能在卵泡液多组学研究中的应用。本文以卵泡液为核心, 结合近些年相关文献, 总结卵泡液的生物学基本特征、卵母细胞衰老机制、卵泡液多组学研究进展及其在 ART 诊疗中的相关应用最新进展, 以期为不孕症患者的辅助生殖精准医学诊疗提供一研究总结。

【关键词】 卵泡液; 卵母细胞; 精准医学; 辅助生殖; 多组学
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Progress in follicular fluid multi-omics research and its applications in reproductive medicine

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【Abstract】 In assisted reproductive technology (ART), oocyte quality and its impact on embryo developmental potential are the key factors determining clinical outcomes. As the core microenvironment for oocyte development, follicular fluid (FF) plays a significant role in reflecting follicular metabolism, oocyte aging, and core signaling transduction pathway. With the continuous advancement of multi-omics technologies, including metabolomics and proteomics, multi-omics analysis of follicular fluid has opened new windows for understanding oocyte growth status, energy metabolic levels, oxidative stress regulation, and embryonic developmental potential. Furthermore, in the diagnosis and treatment of infertility patients, this approach aids in guiding individualized ovarian stimulation, optimizing blastocyst culture, and refining ART strategies. However, current efforts face challenges such as limited sample availability and high costs; therefore, future endeavors must prioritize strengthening multi-center studies, reducing testing costs, and promoting the application of artificial intelligence in multi-omics research of follicular fluid. This article will take FF as the core, combined with relevant literature in recent years, to summarize the basic biological characteristics of FF, the mechanism of oocyte aging, the progress of FF multi-omics research, and the latest progress in the application of FF multi-omics in ART diagnosis and treatment, providing a research summary for the precise medical diagnosis and treatment of infertile patients in ART.

【 Key words 】 Follicular fluid; Oocyte; Precision medicine; Assisted reproduction; Multi-omics

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