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儿童及青少年女性恶性肿瘤患者生育力保存专家共识 (2025 年)

中国妇幼保健协会生育力保存专业委员会

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【摘要】 随着儿童及青少年恶性肿瘤治疗措施的发展, 患者长期生存率显著提高。然而, 治疗带来的生殖毒性却对治愈后患者的生育力构成威胁。在我国, 肿瘤患者生育力保存日益受到关注, 临床实践逐步推广, 但仍面临诸多挑战。为此, 中国妇幼保健协会生育力保存专业委员会联合多学科专家, 结合国内外指南、研究证据及实际经验, 在法律伦理框架下, 制定了适应我国国情的儿童及青少年女性恶性肿瘤患者生育力保存专家共识。本共识系统总结了肿瘤治疗对生育力的影响、生育力保存方法、未来不孕风险评估及实施流程, 提出了多学科团队协作的规范化路径, 并就实践中可能遇到的特殊问题与伦理挑战进行探讨, 旨在为临床生育力保存实践提供科学系统指导。

【关键词】 儿童; 青少年; 女性; 恶性肿瘤; 生育力保存; 专家共识

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Expert consensus on fertility preservation for female children and adolescents with malignant tumors (2025)

Fertility Preservation Committee of Chinese Maternal and Child Health Association

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Medicine; Shanghai Key Laboratory of Embryo Original Disease, Shanghai 200030, China, Email: liwen@shsmu.edu.cn

【Abstract】 With the continuous improvement of cancer treatment, the survival rate of children and adolescents cancer patient has ascended. However, the reproductive toxicity of therapies poses a threat to female reproductive health. In China, fertility preservation (FP) for cancer patients is a growing concern, clinical practice is developing, and the advancement process faces notable challenges. To address this need, the Fertility Preservation Committee of the Chinese Maternal and Child Health Association, together with a multidisciplinary panel of experts, has developed this expert consensus on FP for female pediatric and adolescent cancer patients. Based on domestic and international guidelines, research evidence, and real-world practical experience, and aligned with legal and ethical frameworks, this consensus is tailored to China's national context. It summarizes the impact of cancer treatments on fertility, FP options, the assessment of future infertility risks, and implementation processes. It also establishes a standardized pathway for multidisciplinary collaboration and addresses special clinical issues and ethical considerations. This consensus aims to provide a scientific and practical framework to guide FP efforts in clinical practice.

【Key words】 Children; Adolescents; Female; Malignant tumors; Fertility preservation; Expert consensus

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·子宫内膜损伤性疾病专栏·

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温阳理宫汤对宫腔粘连患者粘连分离术后妊娠结局的影响: 一项回顾性队列研究

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【摘要】 目的 探讨温阳理宫汤对宫腔粘连 (intrauterine adhesion, IUA) 患者宫腔镜下宫腔粘连分离术 (transcervical resection of adhesion, TCRA) 后妊娠结局的影响。**方法** 采用回顾性队列研究方法, 收集 2020 年 1 月至 2023 年 1 月就诊于天津中医药大学第一附属医院生殖医学科并接受 TCRA 的 151 例 IUA 患者的临床资料。根据患者是否在 TCRA 后接受温阳理宫汤治疗将患者分为中药组 (79 例) 和对照组 (72 例)。中药组患者在术后接受雌激素、孕激素序贯治疗的同时联合服用温阳理宫汤 2~3 个月经周期, 对照组为仅接受雌激素、孕激素序贯治疗, 比较两组患者术后一年的妊娠结局; 采用多因素 Cox 回归分析调整混杂因素后, 观察温阳理宫汤对于 IUA 患者 TCRA 后妊娠结局的影响。**结果** 中药组的活产率 [54.43% (43/79)]、持续妊娠率 [56.96% (45/79)] 和临床妊娠率 [52.03% (49/79)] 均高于对照组 [26.39% (19/72), $P<0.001$; 30.56% (22/72), $P=0.001$; 37.50% (27/72), $P=0.003$], 差异均有统计学意义。中药组的早期流产率和晚期流产率与对照组比较差异均无统计学意义 (均 $P>0.05$)。按照备孕方式分层分析显示: 在自然备孕人群中, 中药组的活产率 [60.78% (31/51)]、持续妊娠率 [62.75% (32/51)] 和临床妊娠率 [68.63% (35/51)] 均高于对照组 [21.43% (12/56), $P<0.001$; 26.79% (15/56), $P<0.001$; 33.93% (19/56), $P<0.001$], 差异均有统计学意义; 两组早期流产率和晚期流产率比较差异均无统计学意义 (均 $P>0.05$)。在辅助生殖技术助孕人群中, 两组的活产率、持续妊娠率、临床妊娠率、早期流产率和晚期流产率比较差异均无统计学意义 (均 $P>0.05$)。按照年龄分层分析显示: 在 <35 岁群体中, 中药组的活产率 [66.00% (33/50)]、持续妊娠率 [70.00% (35/50)] 和临床妊娠率 [74.00% (37/50)] 均高于对照组 [41.30% (19/46), $P=0.015$; 47.83% (22/46), $P=0.027$; 54.35% (25/46), $P=0.044$], 差异均有统计学意义; 两组早期流产率和晚期流产率比较差异均无统计学意义 (均 $P>0.05$)。在 ≥ 35 岁群体中, 中药组的活产率 [34.48% (10/29)]、持续妊娠率 [34.48% (10/29)] 和临床妊娠率 [41.38% (12/29)] 均高于对照组 [0%, $P=0.001$; 0%, $P=0.001$; 7.69% (2/26), $P=0.004$], 差异均有统计学意义; 两组早期流产率和晚期流产率比较差异均无统计学意义 (均 $P>0.05$)。单因素 Cox 回归分析显示年龄、既往宫腔操作次数、IUA 评分、IUA 程度、TCRA 后内膜厚度是活产的独立影响因素; 年龄、IUA 评分、IUA 程度、TCRA 后内膜厚度、治疗分组是持续妊娠的影响因素 (均 $P<0.05$)。在调整混杂因素后, 多因素 Cox 回归分析结果显示, 温阳理宫汤能够明显提高 IUA 患者的活产率 ($HR=3.19$, 95% CI : 1.77~8.11, $P=0.001$) 及持续妊娠率 ($HR=3.66$, 95% CI : 1.80~7.48, $P<0.001$)。结论 温阳理宫汤能够显著改善 IUA 患者 TCRA 后的妊娠结局。

【关键词】： 宫腔粘连； 宫腔镜下宫腔粘连分离术； 温阳理宫汤； 活产率； 妊娠结局

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Effect of Wenyang Ligong Decoction on pregnancy outcomes after transcervical resection of adhesion in patients with intrauterine adhesions: a retrospective cohort study

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【Abstract】 Objective To investigate the impact of Wenyang Ligong Decoction on pregnancy outcomes after transcervical resection of adhesions (TCRA) in patients with intrauterine adhesions (IUA). **Methods** A retrospective cohort study was conducted to collect clinical data from 151 patients with IUA who underwent TCRA in the Reproductive Medicine Department of the First Affiliated Hospital of Tianjin University of Traditional Chinese Medicine between January 2020 and January 2023. Patients were divided into a Traditional Chinese medicine (TCM) group (79 patients) and a control group (72 patients) based on whether they received Wenyang Ligong Decoction after TCRA. The TCM group received estrogen and progesterone sequential therapy post-surgery, combined with Wenyang Ligong Decoction for 2–3 menstrual cycles. The control only received sequential treatment with estrogen and progesterone. Pregnancy outcomes one year after surgery were compared between the two groups. After adjusting for confounding factors using multivariate Cox regression analysis, the effect of Wenyang Ligong Decoction on pregnancy outcomes after TCRA in patients with IUA was observed. **Results** The live birth rate [54.43% (43/79)], the ongoing pregnancy rate [56.96% (45/79)], and the clinical pregnancy rate [52.03% (49/79)] were higher in the TCM group than in the control [26.39% (19/72), $P<0.001$; 30.56% (22/72), $P=0.001$; 37.50% (27/72), $P=0.003$], with statistically significant differences. There were no statistically significant differences in early abortion rate and late abortion rate between the TCM group and the control (all $P>0.05$). According to the stratified analysis by preparation methods, in the natural conception group, the live birth rate [60.78% (31/51)], the ongoing pregnancy rate [62.75% (32/51)], and the clinical pregnancy rate [68.63% (35/51)] in the TCM group were significantly higher than those in control group [21.43% (12/56), $P<0.001$; 26.79% (15/56), $P<0.001$; 33.93% (19/56), $P<0.001$]; there were no statistically significant differences in early miscarriage rate and late miscarriage rate between the two groups (both $P>0.05$). In the assisted reproductive technology group, there were no statistically significant differences in live birth rate, ongoing pregnancy rate, clinical pregnancy rate, early miscarriage rate, and late miscarriage rate between the two groups (all $P>0.05$). According to the stratified analysis by age, in the <35-year-old

patients, the live birth rate [66.00% (33/50)], the ongoing pregnancy rate [70.00% (35/50)], and the clinical pregnancy rate [74.00% (37/50)] in the TCM group were significantly higher than those in control group [41.30% (19/46), $P=0.015$; 47.83% (22/46), $P=0.027$; 54.35% (25/46), $P=0.044$]; there were no statistically significant differences in early miscarriage rate and late miscarriage rate between the two groups (both $P>0.05$). In the ≥ 35 -year-old patients, the live birth rate [34.48% (10/29)], the ongoing pregnancy rate [34.48% (10/29)], and the clinical pregnancy rate [41.38% (12/29)] in the TCM group were significantly higher than those in control group [0%, $P=0.001$; 0%, $P=0.001$; 7.69% (2/26), $P=0.004$]; there were no statistically significant differences in early miscarriage rate and late miscarriage rate between the two groups (both $P>0.05$). Univariate Cox regression analysis showed that age, number of previous uterine cavity interventions, IUA score, degree of IUA, and endometrial thickness after TCRA were independent risk factors for live births, and age, IUA score, degree of IUA, intima thickness after TCRA, and treatment group were the influencing factors of persistent pregnancy (all $P<0.05$). After adjusting for confounding factors, multivariate Cox regression analysis showed that Wenyang Ligong Decoction significantly improved the live birth rate ($HR=3.19$, 95% CI : 1.77–8.11, $P=0.001$) and the rate of continuous pregnancy ($HR=3.66$, 95% CI : 1.80–7.48, $P<0.001$) in patients with IUA. **Conclusion** Wenyang Ligong Decoction can significantly improve pregnancy outcomes after TCRA in patients with IUA.

【Key words】 Intrauterine adhesions; Transcervical resection of adhesions; Wenyang Ligong Decoction; Live birth rate; Pregnancy outcome

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·子宫内膜损伤性疾病专栏·

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不同程度宫腔粘连患者子宫内膜菌群特征分析

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【摘要】 目的 探究不同程度宫腔粘连 (intrauterine adhesion, IUA) 患者的子宫内膜菌群特征。方法 本研究为单中心横断面观察性研究, 纳入 2022 年 5 月至 2023 年 10 月于首都医科大学附属复兴医院宫腔镜诊治中心收治的 IUA 患者共 115 例, 经过质量控制和预处理, 满足后续分析要求的样本共 81 例, 根据 IUA 评分和分级系统进行分组, 分为轻度 IUA 组 ($n=38$) 和中重度 IUA 组 ($n=43$)。无菌条件下采集子宫内膜组织样本, 对样本进行细菌基因组 DNA 提取、16S rRNA V3~V4 区基因扩增并采用 Illumina 高通量测序, 比较两组患者子宫内膜菌群的多样性和组成结构。结果 不同程度 IUA 患者的子宫内膜菌群物种丰富度、均匀度及多样性相似。在菌门水平, 所有研究对象的子宫内膜菌群主要由变形菌门、厚壁菌门、蓝菌门、拟杆菌门、放线菌门组成, 其中变形菌门和厚壁菌门占比最高, 平均相对丰度分别为 32.29% 和 23.82%。在菌属水平, 罗尔斯通菌属 (16.67%)、乳杆菌属 (13.45%) 和链球菌属 (7.07%) 为主要优势菌属。组间比较显示, 轻度 IUA 组罗尔斯通菌属丰度较高, 而中重度 IUA 组乳杆菌属、弧菌属及假交替单胞菌属丰度更高, 但差异均未达到统计学意义 (均 $P>0.05$)。LEfSe 分析进一步提示, 中重度 IUA 组乳杆菌属、弧菌属、假交替单胞菌属等丰度相对增加, 而轻度 IUA 组则富集地芽孢杆菌属、口腔杆菌属和梭形链杆菌属。结论 不同程度 IUA 患者的子宫内膜菌群组成存在一定差异。IUA 的进展可能与子宫内膜菌群的变化相关, 但其因果关系及机制仍需进一步研究加以阐明。

【关键词】 乳杆菌属; 16S rRNA 测序; 宫腔粘连; 子宫内膜菌群; 菌群失调

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Analysis of endometrial microbiota characteristics in patients with varying degrees of intrauterine adhesions

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【 Abstract 】 Objective To investigate the characteristics of the endometrial microbiota in patients with varying degrees of intrauterine adhesion (IUA). **Methods** This single-center cross-sectional observational study enrolled 115 patients with IUA who were treated at the Hysteroscopic Center of Fuxing Hospital, Capital Medical University, from May 2022 to October 2023. After quality

control and data preprocessing, 81 samples met the inclusion criteria for analysis. Patients were grouped according to an established IUA scoring and grading system into mild IUA ($n=38$) and moderate-to-severe IUA ($n=43$). Endometrial tissue was collected under sterile conditions. Bacterial genomic DNA was extracted, the 16S rRNA V3–V4 region was amplified, and sequencing was performed on an Illumina platform. Differences in endometrial microbiota diversity and composition were compared between the two groups. **Results** Patients with varying degrees of IUA exhibited comparable species richness, evenness and diversity of endometrial microbiota. At the phylum level, the endometrial microbiota across all subjects was predominantly composed of *Proteobacteria*, *Firmicutes*, *Cyanobacteriota*, *Bacteroidota*, and *Actinobacteriota*, with *Proteobacteria* (32.29%) and *Firmicutes* (23.82%) showing the highest mean relative abundances. At the genus level, *Ralstonia* (16.67%), *Lactobacillus* (13.45%), and *Streptococcus* (7.07%) were the most abundant genera. Group comparisons showed that the abundance of *Ralstonia* was higher in the mild IUA group, whereas *Lactobacillus*, *Vibrio* and *Pseudoalteromonas* were more abundant in the moderate-to-severe IUA group; however, these differences did not reach statistical significance (all $P>0.05$). LEfSe analysis further indicated that *Lactobacillus*, *Vibrio*, *Pseudoalteromonas*, *Aeromonas*, *Ureaplasma* and *Acetobacterium* were relatively enriched in the moderate-to-severe IUA group, while *Geobacillus*, *Stomatobaculum* and *Fusicatenibacter* were more abundant in the mild IUA group. **Conclusion** The composition of the endometrial microbiota differs among patients with varying IUA severity. IUA progression may be associated with alterations in the endometrial microbiota; however, causal relationships and underlying mechanisms require further investigation.

【Key words】 *Lactobacillus*; 16S rRNA sequencing; Intrauterine adhesion; Endometrial microbiota; Dysbiosis

Fund program: Xicheng District Talent Development Support Program (2024QRC1724); Capital Medical University Student Research Training Project (XSKY2025234); Fuxing Hospital Incubation Fund (PY-C-202215b)

·子宫内膜损伤性疾病专栏·

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宫腔粘连的治疗及生育衔接

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【摘要】 宫腔粘连是由于子宫内膜基底层损伤,引起子宫内膜纤维化,宫腔内瘢痕和纤维粘连带形成,甚至引起宫腔部分或全部封闭,对生殖预后造成影响。宫腔镜下宫腔粘连分离术是治疗的“金标准”,术中需关注对子宫内膜的保护,超声或联合腹腔镜监护保证手术的安全和精准;术后需要综合治疗促进内膜修复,抑制纤维化形成,预防复发。治疗的最终目标是尽可能恢复宫腔形态,改善生育力;对有生育要求的患者,要积极评估,帮助其尽快实现生育的衔接。

【关键词】 宫腔粘连; 宫腔镜手术; 子宫内膜修复; 子宫内膜纤维化; 生育力

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Treatment of intrauterine adhesion and following fertility

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【Abstract】 Intrauterine adhesion (IUA) is caused by damage to the basal layer of the endometrium, leading to endometrial fibrosis, formation of scars and even partial or complete obliteration of the uterine cavity, which affects reproductive prognosis. Hysteroscopic adhesionolysis is considered the gold standard treatment for IUA. Surgical techniques and intra-operative guidance by ultrasound or combined laparoscopy is the key step. The ultimate aim of treatment is to recover the shape of uterine cavity as much as possible and repair the endometrium, then improve fertility. Post-operative comprehensive treatment is required to promote endometrial repair, inhibit fibrosis formation, prevent recurrence. It is also very important to help patients with fertility requirements achieve fertility soon after operation.

【Key words】 Intrauterine adhesion; Hysteroscopic surgery; Endometrial repair; Endometrial fibrosis; Fertility

Fund program: Capital's Funds for Health Improvement and Research Key Breakthrough Project (CFH 2020-1-7027)

·子宫内膜损伤性疾病专栏·

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子宫内膜损伤性疾病的中西医结合治疗

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【摘要】 子宫内膜损伤性疾病是导致女性不孕、月经减少、不良妊娠结局的重要影响因素。临床多表现为宫腔粘连、子宫内膜薄以及子宫内膜容受性下降, 恢复宫腔形态、促进子宫内膜功能重建是治疗的主要目的。目前西医主要以激素类药物治疗和手术治疗为主。中医药在治疗子宫内膜损伤性疾病及预防术后复发方面具有良好疗效和优势。中医学辨证以肾虚为主、血瘀为标、常见肝郁, 治法宜补肾养血、化瘀调膜。通过病证结合手段, 采用经典处方加减、临床有效经验方、针药并用及中药外治等方法可改善子宫内膜损伤性疾病患者的效果及预后。本文通过对子宫内膜损伤性疾病中西医结合治疗进展进行综述, 为其临床治疗提供参考。

【关键词】 子宫内膜; 宫腔粘连; 中西医结合; 生育管理

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Treatments of endometrial injury diseases with integrated Traditional Chinese and Western Medicine

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【Abstract】 Endometrial injury diseases are an important factors in female infertility, reduced menstruation, and adverse pregnancy outcomes. Clinical

characteristics include intrauterine adhesions, a thin endometrium, and reduced endometrial receptivity. Restoring the morphology of the uterine cavity and promoting endometrial reconstruction are the main goals of treatment. At present, hormone medication and surgery are the major Western medicine treatments. Traditional Chinese Medicine has an advantage in treating endometrial injury and preventing postoperative recurrence. Traditional Chinese Medicine diagnosis focuses on "kidney deficiency" as the primary condition,"blood stasis" as the secondary condition, and combined with "liver depression". Therapeutic strategies aim to "replenish kidney""nourish blood""dispel blood stasis", and improve the endometrium. By means of combination of disease and syndrome, classical prescription addition and subtraction, clinical effective experience, combination of acupuncture and medicine and external treatment of Traditional Chinese Medicine can improve the effect and prognosis of patients with endometrial injury diseases. This article reviews the progress of combined Traditional Chinese and Western Medicine treatment of endometrial injury diseases to provide reference for its clinical treatment.

【Key words】 Endometrium; Intrauterine adhesions; Integrated Traditional Chinese and Western Medicine; Fertility management

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·子宫内膜损伤性疾病专栏·

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雌激素在子宫内膜修复中的应用及研发进展

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【摘要】 雌激素与女性子宫内膜的受体结合后,可促进子宫内膜间质细胞增殖、分化和血管生成,从而在女性子宫内膜损伤修复及再生、预防和治疗子宫内膜粘连等方面发挥关键作用。目前已有多种雌激素药物制剂应用于临床,另有相关产品的研发也在逐步推进中。本文旨在系统阐述子宫内膜损伤的病因,以及雌激素在子宫内膜损伤修复、再生中的作用,并总结雌激素类药物在子宫内膜修复中的研究进展和临床应用,为相关科研工作和临床实践提供参考。

【关键词】 雌激素; 子宫内膜损伤; 药物制剂; 应用; 研发进展

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Application and research progress of estrogen in endometrial repair

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【 Abstract 】 Estrogen, through binding to its receptors in the female endometrium, promotes the proliferation, differentiation, and angiogenesis of endometrial stromal cells, thereby playing a critical role in endometrial injury repair, regeneration, and the prevention and treatment of intrauterine adhesions. Currently, various estrogen-based pharmaceutical formulations are applied in clinical practice, and the development of related products is progressively advancing. This review systematically outlines the etiology of endometrial injury and the mechanisms by which estrogen facilitates endometrial repair and regeneration. Furthermore, it highlights recent research progress and clinical applications of estrogen-based therapies in endometrial regeneration, aiming to provide a valuable reference for relevant scientific research and clinical practice.

【 Key words 】 Estrogen; Endometrial injury; Medical preparations; Application; Research progress

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临床研究

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自然周期与改良自然周期体外受精在 DOR 患者个体化辅助生殖中的临床应用及结局评估

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【摘要】 目的 比较卵巢储备功能减退 (diminished ovarian reserve, DOR) 患者应用自然周期 (natural cycle, NC) 与改良自然周期 (modified natural cycle, MNC) 辅助生殖治疗结局, 为 DOR 患者个体化治疗提供科学依据。方法 采用回顾性队列研究, 分析 2015 年 1 月 1 日至 2023 年 12 月 31 日在北京大学第三医院妇产科生殖医学中心接受辅助生殖治疗的 DOR 患者的临床资料。根据治疗方案分为 NC 组 ($n=801$) 和 MNC 组 ($n=385$)。比较两组治疗方案的实验室指标及妊娠结局,

主要结局为周期取消率、获卵率，次要结局为新鲜移植和冻胚解冻移植周期的临床妊娠率、活产率、累积妊娠率和累积活产率，及获卵数、双原核（two pronuclei, 2PN）受精数、可移植胚胎数、可移植胚胎形成率等实验室指标，并进一步采用多因素 logistic 回归分析治疗方案对妊娠和活产结局的影响。结果 NC 组与 MNC 组患者在年龄、体质指数、基础激素水平等一般情况方面差异均无统计学意义（均 $P>0.05$ ）。NC 组的周期取消率 [19.10% (153/801)] 较 MNC 组 [10.65% (41/385)] 显著升高（ $P<0.001$ ），NC 组的获卵率 [66.31% (431/650)] 较 MNC 组 [74.86% (259/346)] 显著降低（ $P=0.005$ ）。NC 组的获卵数 [1 (0, 1) 个]、2PN 受精数 [1 (0, 1) 个]、可移植胚胎数 [0 (0, 1) 个] 较 MNC 组 [1 (1, 2) 个, $P<0.001$; 1 (1, 1) 个, $P<0.001$; 0 (0, 1) 个, $P<0.001$] 均显著降低，但 NC 组的 2PN 受精率和可移植胚胎形成率与 MNC 组比较，差异均无统计学意义（均 $P>0.05$ ）。在新鲜胚胎移植周期和冻融胚胎移植周期中，NC 组的临床妊娠率和活产率与 MNC 组比较，差异均无统计学意义（均 $P>0.05$ ）。NC 组每移植胚胎周期的累积妊娠率、每启动周期的累积妊娠率、每移植胚胎周期的累积活产率、每启动周期的累积活产率与 MNC 组比较，差异均无统计学意义（均 $P>0.05$ ）。多因素 logistic 回归分析显示与 MNC 相比，NC 与临床妊娠、活产发生之间均无显著相关性。结论 与 NC 相比，MNC 一定程度上降低了周期取消率，提高了获卵率，但并未改善 DOR 患者的妊娠结局。

【关键词】 妊娠结局； 卵巢储备功能减退； 自然周期； 改良自然周期； 实验室结局

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Clinical application and outcomes of natural cycle and modified natural cycle IVF for individualized assisted reproduction among patients with DOR

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【Abstract】 **Objective** To investigate the outcomes of natural cycle (NC) and modified natural cycle (MNC) assisted reproductive technology (ART) in patients with diminished ovarian reserve (DOR), and to provide a scientific basis for individualized treatment strategies for DOR patients. **Methods** A retrospective cohort analysis was performed on the clinical data of DOR patients who underwent ART at the Center for Reproductive Medicine of the Department of Obstetrics and Gynecology, Peking University Third Hospital from January 1, 2015 to December 31, 2023. Patients were divided into the NC group ($n=801$) and the

MNC group ($n=385$) based on their treatment protocol. The primary outcomes were cycle cancellation rate and oocyte retrieval rate. Secondary outcomes included clinical pregnancy rate and live birth rate per fresh embryo transfer cycle and frozen-thawed embryo transfer cycle, cumulative pregnancy rate and cumulative live birth rate per started cycle and per transfer cycle, as well as laboratory parameters such as the number of retrieved oocytes, the number of two pronuclei (2PN) fertilized oocytes, the number of transferable embryos, and transferable embryo formation rate. Further, multivariate logistic regression was used to analyze the impact of the treatment protocol on pregnancy and live birth outcomes.

Results There were no statistically significant differences between the NC and MNC groups in terms of general characteristics such as age, body mass index, and baseline hormone levels (all $P>0.05$). The cycle cancellation rate was significantly higher in the NC group [19.10% (153/801)] than in the MNC group [10.65% (41/385), $P<0.001$], and the oocyte retrieval rate was significantly lower in the NC group [66.31% (431/650)] than in the MNC group [74.86% (259/346), $P=0.005$]. The number of retrieved oocytes [1 (0,1)], the number of 2PN fertilized oocytes [1 (0,1)], and the number of transferable embryos [0 (0, 1)] were also significantly lower in the NC group than in the MNC group [1 (1, 2), $P<0.001$; 1 (1, 1), $P<0.001$; 0 (0, 1), $P<0.001$]. However, there were no statistically significant differences in 2PN fertilization rate and transferable embryo formation rate between the NC and MNC groups (all $P>0.05$). In both fresh embryo transfer cycles and frozen-thawed embryo transfer cycles, there were no statistically significant differences in clinical pregnancy rate and live birth rate between the NC and MNC groups (all $P>0.05$). The cumulative pregnancy rate per started cycle and transfer cycle, the cumulative live birth rate per started cycle and per transfer cycle were also not significantly different between the NC and MNC groups (all $P>0.05$). Multivariate logistic analysis showed no significant association between NC and clinical pregnancy or live birth compared with MNC.

Conclusion While MNC to some extent reduced the cycle cancellation rate and improved oocyte retrieval rates compared with NC, it did not ultimately improve pregnancy outcomes in DOR patients.

【Key words】 Pregnancy outcome; Diminished ovarian reserve; Natural cycle; Modified natural cycle; Laboratory outcome

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第3天胚胎质量在解冻单囊胚移植周期中优选胚胎的价值分析

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【摘要】 目的 探讨第3天(day 3, D3)胚胎质量对解冻单囊胚移植周期妊娠结局的影响, 分析其在优选胚胎中的价值。方法 采用回顾性队列研究, 分析郑州大学第三附属医院生殖健康医院2020年1月至2023年12月行解冻单囊胚移植周期患者的临床资料。共纳入D3高质量胚胎(high-quality day 3 embryo, H-D3)组4 691个周期, D3低质量胚胎(low-quality day 3 embryo, L-D3)组2 598个周期。采用多因素logistic回归分析D3胚胎质量对临床妊娠率(clinical pregnancy rate, CPR)及活产率(live birth rate, LBR)的影响。按照囊胚发育天数及囊胚质量将移植周期分层为第5天高质量囊胚(high-quality day 5 blastocysts, H-D5)周期($n=3\ 920$)、第5天低质量囊胚(low-quality day 5 blastocysts, L-D5)周期($n=1\ 271$)、H-D6周期($n=834$)及L-D6周期($n=1\ 264$), 分析在不同情况下D3胚胎质量对CPR及LBR的影响。结果 ①H-D3组与L-D3组相比: 女性年龄 [(31.79 ± 4.42) 岁比 (32.28 ± 4.43) 岁, $P<0.001$]、基础卵泡刺激素水平 [$6.24(5.32, 7.35)$ U/L比 $6.48(5.42, 7.62)$ U/L, $P<0.001$]、原发不孕占比 [$35.86\%(1\ 682/4\ 691)$ 比 $31.99\%(831/2\ 598)$, $P<0.001$]、 ≥ 2 次移植失败周期占比 [$3.77\%(177/4\ 691)$ 比 $5.93\%(154/2\ 598)$, $P<0.001$]、新鲜周期激动剂/拮抗剂超促排卵方案占比 [$93.33\%(4\ 378/4\ 691)$ 比 $89.80\%(2\ 333/2\ 598)$, $P<0.001$]、胚胎冷冻储存时间 [$3.10(2.23, 7.27)$ 个月比 $3.60(2.30, 15.40)$ 个月, $P<0.001$]、移植D5囊胚占比 [$74.82\%(3\ 510/4\ 691)$ 比 $64.70\%(1\ 681/2\ 598)$, $P<0.001$]及移植高质量囊胚占比 [$72.59\%(3\ 405/4\ 691)$ 比 $51.92\%(1\ 349/2\ 598)$, $P<0.001$] 差异均存在统计学意义, 女方体质指数、不孕年限、解冻周期内膜准备方案及移植日内膜厚度组间差异均无统计学意义(均 $P>0.05$)。②多因素逻辑回归分析显示, L-D3组CPR($OR=0.837$, 95% CI : $0.754\sim0.929$, $P<0.001$)及LBR($OR=0.880$, 95% CI : $0.794\sim0.974$, $P=0.014$)均显著低于H-D3组。③在H-D5周期、L-D5周期中L-D3对CPR(校正后 $OR=0.941$, 95% CI : $0.805\sim1.101$, $P=0.449$; 校正后 $OR=0.910$, 95% CI : $0.724\sim1.142$, $P=0.415$)及LBR(校正后 $OR=1.034$, 95% CI : $0.893\sim1.196$, $P=0.657$; 校正后 $OR=0.917$, 95% CI : $0.729\sim1.153$, $P=0.457$)的影响差异均无统计学意义; 在H-D6周期及L-D6周期中L-D3显著降低CPR(校正后 $OR=0.732$, 95% CI : $0.542\sim0.987$, $P=0.041$; 校正后 $OR=0.648$, 95% CI : $0.515\sim0.815$, $P<0.001$)及LBR(校正后

$OR=0.645$, 95% $CI: 0.479\sim0.869$, $P=0.004$; 校正后 $OR=0.670$, 95% $CI: 0.526\sim0.854$, $P=0.001$)。结论 D3 胚胎质量对解冻 D6 单囊胚移植周期的 CPR 及 LBR 均有显著影响, D6 囊胚移植优选时 D3 胚胎质量可能具有重要的参考价值。

【关键词】 胚胎移植; 妊娠率; 活产率; 单囊胚移植; 卵裂期胚胎

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Analysis of the value of day 3 embryo quality in embryo selection for frozen-thawed single blastocyst transfer cycles

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【Abstract】 Objective To investigate the impact of day 3 embryo quality on pregnancy outcomes in frozen-thawed single blastocyst transfer cycles and analyze its value in embryo selection. **Methods** A retrospective cohort study was conducted on clinical data from patients undergoing frozen-thawed single blastocyst transfer at the Reproductive Health Hospital of the Third Affiliated Hospital of Zhengzhou University from January 2020 to December 2023. A total of 4 691 cycles of high-quality day 3 embryo (H-D3) group and 2 598 cycles of low-quality day 3 embryo (L-D3) group in the same period were included. Multivariate logistic regression was used to analyze the effects of day 3 embryo quality on clinical pregnancy rate (CPR) and live birth rate (LBR). All the cycles were stratified according to developmental day and quality of blastocyst: 3 920 cycles of high-quality day 5 blastocysts (H-D5), 1 271 cycles of low-quality day 5 blastocysts (L-D5), 834 cycles of H-D6 group and 1 264 cycles of L-D6, the influence of day 3 embryo quality was subsequently analyzed under different conditions.

Results 1) Significant differences were observed between H-D3 and L-D3 groups in female age [(31.79±4.42) years vs. (32.28±4.43) years, $P<0.001$], basal follicle-stimulating hormone levels [6.24 (5.32,7.35) U/L vs. 6.48 (5.42,7.62) U/L, $P<0.001$], proportion of primary infertility [35.86% (1 682/4 691) vs. 31.99% (831/2 598), $P<0.001$], proportion of ≥ 2 prior failed embryo transfer cycles [3.77% (177/4 691) vs. 5.93% (154/2 598), $P<0.001$], proportion of gonadotropin-releasing hormone agonist/antagonist controlled ovarian hyperstimulation protocol in fresh cycles [93.33% (4 378/4 691) vs. 89.80% (2 333/2 598), $P<0.001$], embryo cryopreservation duration [3.10 (2.23,7.27) months vs. 3.60 (2.30,15.40) months, $P<0.001$], proportion of day 5 blastocyst transfers [74.82% (3 510/4 691) vs. 64.70% (1 681/2 598), $P<0.001$] and proportion of high-quality blastocyst transfers [72.59% (3 405/4 691) vs. 51.92% (1 349/2 598), $P<0.001$]. No significant differences were found in body mass index, infertility duration, endometrial preparation program or endometrial thickness on transfer day (all $P>0.05$). 2) Multivariable logistic regression analysis demonstrated that the L-D3 group had significantly lower CPR ($OR=0.837$, 95% $CI: 0.754\sim0.929$, $P<0.001$) and LBR ($OR=0.880$, 95% $CI: 0.794\sim0.974$, $P=0.014$) compared with the H-D3 group.

3) In H-D5 and L-D5 cycles, L-D3 did not significantly affect CPR ($aOR=0.941$, 95% CI : 0.805–1.101, $P=0.449$; $aOR=0.910$, 95% CI : 0.724–1.142, $P=0.415$) or LBR ($aOR=1.034$, 95% CI : 0.893–1.196, $P=0.657$; $aOR=0.917$, 95% CI : 0.729–1.153, $P=0.457$). However, in D6-H and D6-L cycles, L-D3 significantly reduced CPR ($aOR=0.732$, 95% CI : 0.542–0.987, $P=0.041$; $aOR=0.648$, 95% CI : 0.515–0.815, $P<0.001$) and LBR ($aOR=0.645$, 95% CI : 0.479–0.869, $P=0.004$; $aOR=0.670$, 95% CI : 0.526–0.854, $P=0.001$). **Conclusion** Day 3 embryo quality significantly impacts both CPR and LBR in frozen-thawed day 6 single blastocyst transfer cycles. This suggests that day 3 embryo quality retains clinical relevance as a selection criterion when prioritizing day 6 blastocysts for transfer.

【Key words】 Embryo transfer; Pregnancy rate; Live birth rate; Single blastocyst transfer; Cleavage embryo

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多囊卵巢综合征患者 IVF/ICSI-ET 活产结局的危险因素分析与预测模 型建立

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【摘要】 目的 探讨多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 患者体外受精 / 卵胞质内单精子注射 - 胚胎移植 (in vitro fertilization/intracytoplasmic sperm injection and embryo transfer,

IVF/ICSI-ET) 活产结局的危险因素, 并建立预测模型。方法 本研究采用回顾性病例对照研究设计, 收集 2018 年 6 月至 2023 年 1 月于北部战区总医院生殖医学科行 IVF/ICSI-ET 助孕的 563 例 PCOS 患者, 按照是否活产分成活产组 ($n=341$) 和非活产组 ($n=222$)。运用 logistic 回归分析来探究单因素和多因素对结果的影响, 将多因素回归中 $P<0.05$ 的值筛选出, 共同代入多因素回归建立整体预测模型, 并推导出列线图, 对 PCOS 患者 IVF/ICSI-ET 助孕的活产结局进行预测。受试者工作特征曲线下面积 (area under the curve, AUC)、校准曲线、Hosmer-Lemeshow (H-L) 拟合优度检验和决策曲线分析用于评估列线图的校准和临床决策性能。对 PCOS 患者 IVF-ET 助孕的临床妊娠结局为是否活产进行预测。最后根据决策曲线评估列线图的临床应用价值。结果 ①单因素分析显示, 活产组和非活产组的年龄、体质指数 (body mass index, BMI)、胰岛素水平、优质胚胎数和优质胚胎率差异均具有统计学意义 (均 $P<0.05$)。②调整混杂因素后对影响活产组相关变量进行多因素 logistic 回归分析显示: 年龄 ($OR=1.151$, 95% $CI: 1.061\sim1.249$, $P=0.001$)、体质指数 ($OR=1.141$, 95% $CI: 1.074\sim1.214$, $P<0.001$) 及胰岛素水平 ($OR=1.206$, 95% $CI: 1.149\sim1.266$, $P<0.001$) 为活产结局的独立危险因素; 优质胚胎率 ($OR=0.101$, 95% $CI: 0.033\sim0.310$, $P<0.001$) 为保护因素; 优质胚胎数 ($OR=0.949$, 95% $CI: 0.887\sim1.014$, $P=0.104$) 与活产结局未见显著统计学关联。③建立 PCOS 患者 IVF/ICSI-ET 助孕后活产结局的预测模型。PCOS 患者的女方年龄、BMI、优质胚胎率和胰岛素水平、预测活产结局的 AUC 值分别为 0.581、0.747、0.725 和 0.813, 这 4 种因素的组合模型在预测活产结局的 AUC 值为 0.846。④建立 PCOS 患者 IVF/ICSI-ET 助孕后活产结局的列线图预测模型。模型校准曲线斜率接近 1, H-L 检验 $P>0.05$, 提示预测事件与实际事件的一致性较高, 决策分析曲线证实了预测模型的临床实用性。结论 年龄、BMI、胰岛素水平是 PCOS 患者 IVF/ICSI-ET 活产结局的独立危险因素, 优质胚胎率是保护因素。基于上述因素构建的预测模型具有良好的预测效能, 可为临床决策提供参考。

【关键词】 多囊卵巢综合征; 受精, 体外; 胚胎移植; 危险因素; 活产结局

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Establishment of a predictive model and analysis of risk factors for live birth outcomes in PCOS patients undergoing IVF/ICSI-ET

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【Abstract】 **Objective** To investigate the risk factors affecting live birth outcomes in patients with polycystic ovary syndrome (PCOS) undergoing *in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer (IVF/ICSI-ET) and to establish a predictive model. **Methods** A retrospective case-control study was conducted by collecting data from 563 patients with PCOS who were treated at the Reproductive Medicine Department of the General Hospital of Northern Theater Command between June 2018 and January 2023. Patients were divided into live birth ($n=341$) and non-live birth ($n=222$) groups based on pregnancy outcomes. Univariate and multivariate logistic regression analyses were performed

to identify risk factors, followed by construction of a nomogram prediction model based on values with $P < 0.05$ in multiple regression analysis. The model's predictive performance was evaluated using receiver operating characteristic curve analysis, calibration curves, Hosmer-Lemeshow (H-L) goodness-of-fit test, and decision curve analysis. **Results** 1) Univariate analysis revealed that there were statistically significant differences in age, body mass index (BMI), insulin level, the number of high-quality embryos, and the rate of high-quality embryos between the two groups (all $P < 0.05$). 2) After adjusting for confounding factors, the results of multivariate logistic regression analysis on variables associated with live birth outcomes in the live birth group showed that: age ($OR = 1.151$, 95% CI : 1.061–1.249, $P = 0.001$), body mass index ($OR = 1.141$, 95% CI : 1.074–1.214, $P < 0.001$), and insulin level ($OR = 1.206$, 95% CI : 1.149–1.266, $P < 0.001$) were independent risk factors for live birth outcome; top-quality embryo rate ($OR = 0.101$, 95% CI : 0.033–0.310, $P < 0.001$) was a protective factor; and the number of top-quality embryos ($OR = 0.949$, 95% CI : 0.887–1.014, $P = 0.104$) showed no statistically significant association with live birth outcome. 3) A predictive model for the live-birth outcome after IVF/ICSI-ET in PCOS patients was established. The area under the curve (AUC) values for predicting the live-birth outcome based on female age, BMI, the rate of high-quality embryos, and insulin level were 0.581, 0.747, 0.725, and 0.813, respectively. The combined model of these four factors had an AUC value of 0.846 for predicting the live-birth outcome. 4) A nomogram predictive model for the live-birth outcome after IVF/ICSI-ET in PCOS patients was established. The slope of the model's calibration curve was close to 1, and the H-L test yielded a $P > 0.05$, indicating a high consistency between predicted and actual events. The decision analysis curve confirmed the clinical practicality of the predictive model. **Conclusion** Age, BMI and insulin level are independent risk factors for live birth outcomes in PCOS patients undergoing IVF/ICSI-ET, while the high-quality embryo rate serves as a protective factor. The established predictive model demonstrates excellent performance and may facilitate clinical decision-making.

【Key words】 Polycystic ovary syndrome; *In vitro* fertilization; Embryo transfer; Risk factors; Live birth outcome

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产后避孕健康教育实施策略的最佳证据总结

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【摘要】 目的 检索、评价和汇总产后避孕健康指导的最佳证据, 为临床医护人员实施规范的避孕指导管理提供证据支持。方法 系统检索指南网站、专业协会网站、数据库中所有关于产后避孕指导的相关文献, 包括指南、最佳实践、专家共识、系统评价, 检索时限为建库至 2023 年 12 月。由 4 名研究者独立对纳入文献进行质量评价, 对符合标准的文献进行资料提取与证据汇总。结果 共纳入 18 篇文献, 包括指南 5 篇、临床决策 2 篇、最佳实践 1 篇、专家共识 4 篇、meta 分析和系统评价 6 篇。最终形成 46 条最佳证据, 包括施教人员、施教对象、评估、计划、施教形式、施教内容、避孕方法、效果评价指标以及注意事项 9 个方面。结论 本研究系统性汇总了产后避孕健康指导的最佳证据, 强调提升临床医护人员施教能力, 通过结构化评估与程序化指导以提高避孕指导的可行性和可及性。还应关注避孕方案的长期持续性, 结合数字化工具提升指导精准性与覆盖率, 从而减少意外妊娠与短妊娠间隔, 保障女性生育力。

【关键词】 避孕; 产后期; 健康指导; 最佳证据总结

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Summary of best evidence for implementation strategies in postpartum contraception health education

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【Abstract】 Objective To search, evaluate, and summarize the best evidence for postpartum contraceptive health guidance, providing evidence-based support for clinical healthcare providers in implementing standardized contraceptive counseling and management. **Methods** A systematic search was conducted across guideline repositories, professional association websites, and databases for literature related to postpartum contraception guidance, including guidelines, best practices, expert consensus, and systematic reviews, with a search timeframe from database inception to December 2023. Four researchers independently evaluated the quality of the included studies, extracted relevant data, and synthesized evidence from eligible literature. **Results** According to the inclusion and exclusion criteria, 18 documents were included, comprising 5 guidelines, 2 clinical decision-making documents, 1 best practice document, 4 expert consensus statements, and 6 meta-analyses or systematic reviews. Totally 46 pieces of best evidence were summarized from 9 aspects, including health educators, health education recipients, assessment, planning, mode and content of health education, available contraceptive methods, evaluation index of health education, and considerations. **Conclusion** This study systematically synthesizes the best available evidence on postpartum contraceptive health guidance. It emphasizes strengthening the competencies of clinical practitioners, supported by structured assessments and standardized guidance, to improve the feasibility and accessibility of contraceptive services. It further highlights the importance of ensuring the long-term sustainability of contraceptive plans and integrating digital tools to enhance the precision and coverage of guidance, ultimately reducing unintended and short-interval pregnancies and safeguarding women's reproductive health.

【Key words】 Contraception; Postpartum period; Health guidance; Best evidence summary

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·现场调查·

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注: 同列肩标字母表示各组间通过卡方检验-多重比较 (Bonferroni 法) 后, 相同字母-差异无统计学意义 ($P>0.05$), 不同字母-差异有统计学意义 ($P<0.05$); 括号中示阳性数/总数

青海省育龄女性不孕症患病率调查及影响因素分析

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【摘要】 目的 调查青海省育龄女性不孕症患病情况及影响因素。方法 采用分层整群随机抽样方法在 2024 年 7 月至 2024 年 12 月青海省 8 个市的 10 个地区选取 20~49 岁育龄女性进行问卷调查, 了解青海省不孕症患病情况, 采用单因素及多因素二元 logistic 回归分析不孕症的相关影响因素。结果 共发放 3 925 份问卷, 最终收回有效问卷 3 837 份。初步筛选出不孕症患者 581 例, 不孕率约为 15.1%。其中 29.26% (170/581) 为原发性不孕, 70.74% (411/581) 为继发性不孕。不孕率最高为玉树州玉树市, 不孕率为 26.1% (71/272), 其次是西宁市城西区, 不孕率为 25.3% (174/688), 不孕率最低为海西州德令哈市, 为 2.9% (9/311)。单因素分析显示, 户籍性质 ($P<0.001$)、年龄 ($P=0.016$)、结婚年龄 ($P=0.001$)、最高学历 ($P<0.001$)、人均年收入 ($P=0.001$)、体质指数 (body mass index, BMI, $P=0.005$)、海拔 ($P<0.001$)、初潮年龄 ($P=0.011$)、月经周期是否规律 ($P<0.001$)、月经周期 ($P=0.001$)、月经期长短 ($P<0.001$)、经期有无血块 ($P<0.001$)、女性吸烟情况 ($P=0.008$)、女性熬夜情况 ($P=0.022$)、丈夫是否熬夜 ($P<0.001$) 与不孕率有关。多因素二元 logistic 分析中显示, 非农户籍 ($OR=1.637$, 95% CI : 1.304~2.054, $P<0.001$)、BMI ≥ 24.0 kg/m² ($OR=1.326$, 95% CI : 1.077~1.632, $P=0.008$)、初潮年龄 >14 岁 ($OR=1.405$, 95% CI : 1.158~1.705, $P=0.001$)、月经周期不规律 ($OR=1.512$, 95% CI : 1.127~2.029, $P=0.006$)、月经周期 <21 d ($OR=1.572$, 95% CI : 1.237~1.998, $P<0.001$)、月经期 <7 d ($OR=2.080$, 95% CI : 1.529~2.831, $P<0.001$)、吸烟 ($OR=2.359$, 95% CI : 1.056~5.271, $P=0.036$) 是不孕症的独立危险因素; 年龄、海拔不是青海省育龄女性不孕患病的独立危险因素。结论 青海省育龄女性不孕症患病率约为 15.1%, 非农户籍、BMI ≥ 24.0 kg/m²、初潮年龄 >14 岁、月经周期不规律、月经周期 <21 d、月经期 <7 d、吸烟是青海省育龄女性不孕症发生的影响因素, 高海拔不会增加不孕症的患病风险。

【关键词】 不孕症; 育龄期女性; 患病率; 高海拔; 青海省

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Analysis of the prevalence and influencing factors of infertility in women of reproductive age in Qinghai Province

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【Abstract】 Objective To investigate the prevalence of infertility and the factors affecting it in women of reproductive age in Qinghai Province. **Methods** From July to December 2024, a multi-stage stratified cluster random sampling approach was used to recruit women aged 20–49 years in 10 districts across 8 cities in Qinghai Province for a questionnaire survey assessing the prevalence of infertility. Univariate and multivariate binary logistic regression analyses were then performed to identify factors associated with infertility in Qinghai Province. **Results** A total of 3 925 questionnaires were distributed, with 3 837 valid responses ultimately collected. Preliminary screening identified 581 infertility cases, yielding an infertility rate of approximately 15.1%. Among these, 170 cases were primary infertility and 411 were secondary infertility, accounting for 29.26% and 70.74% of infertility cases, respectively. The highest infertility rate was observed in Yushu City, Yushu Prefecture, at 26.1% (71/272), followed by Chengxi District, Xining City at 25.3% (174/688). The lowest infertility rate was recorded in Delingha City, Haixi Prefecture, at only 2.9% (9/311). Univariate analysis revealed that household registration status ($P<0.001$), age ($P=0.016$), age at marriage ($P=0.001$), highest educational attainment ($P<0.001$), per capita annual income ($P=0.001$), body mass index (BMI, $P=0.005$), altitude ($P<0.001$), age at menarche ($P=0.011$), menstrual regularity ($P<0.001$), menstrual cycle ($P=0.001$), menstrual duration ($P<0.001$), presence of blood clots ($P<0.001$), whether the women smoking ($P=0.008$), whether the women staying up late ($P=0.022$), and whether the husband staying up late ($P<0.001$) were independent factors for infertility. Multivariate binary logistic regression analysis revealed that non-agricultural household registration ($OR=1.637$, 95% CI : 1.304–2.054, $P<0.001$), $BMI\geq 24.0$ kg/m² ($OR=1.326$, 95% CI : 1.077–1.632, $P=0.008$), age at menarche >14 years ($OR=1.405$, 95% CI : 1.158–1.705, $P=0.001$), irregular menstrual cycles ($OR=1.512$, 95% CI : 1.127–2.029, $P=0.006$), menstrual cycle <21 d ($OR=1.572$, 95% CI : 1.237–1.998, $P<0.001$), menstrual duration <7 d ($OR=2.080$, 95% CI : 1.529–2.831, $P<0.001$), and smoking ($OR=2.359$, 95% CI : 1.056–5.271, $P=0.036$) were independent risk factors for infertility. Age and altitude were not independent risk factors for infertility in Qinghai Province. **Conclusion** The prevalence of infertility in Qinghai Province is approximately 15.1%. Non-agricultural household registration, $BMI\geq 24.0$ kg/m², age at menarche >14 years, irregular menstrual cycles, menstrual cycle <21 d, menstrual duration <7 d, and smoking are factors influencing infertility, while high altitude does not increase the risk of infertility among women in Qinghai Province.

【Key words】 Infertility; Women of reproductive age; Prevalence; High altitude; Qinghai Province

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屈螺酮炔雌醇片治疗早期妊娠相关子宫动静脉瘘 4 例病例报道与疗效分析

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【摘要】 子宫动静脉瘘 (uterine arteriovenous fistula, UAVF) 是一种比较罕见的血管异常疾病, 可导致危及生命的严重出血, 在基层医院第一时间诊断和处理较为困难。本文报道了 2023—2024 年诸暨市妇幼保健院妇科应用屈螺酮炔雌醇片治疗的 4 例 UAVF 的诊疗情况, 结合文献回顾, 系统分析了该病的病因机制、临床特征及诊疗策略, 重点探讨药物保守治疗的疗效与安全性, 旨在为 UAVF 的早期识别、精准诊断及合理干预提供临床依据, 以降低大出血风险及远期并发症发生率, 改善患者预后。

【关键词】 子宫动静脉瘘; 异常子宫出血; 药物疗法; 超声检查; 宫腔镜手术

Drospirenone and ethinyl estradiol tablets in the management of early pregnancy-related uterine arteriovenous fistula: a 4-case series with efficacy evaluation

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【Abstract】 Uterine arteriovenous fistula (UAVF), a relatively rare vascular anomaly, may lead to life-threatening hemorrhage and poses diagnostic and management challenges for primary hospitals during initial encounters. This article reports four cases of UAVF treated with Drospirenone and ethinyl estradiol tablets at Department of Gynaecology, Zhuji Maternal and Child Health Hospital between 2023 and 2024. Combined with literature review, we systematically analyzed the etiological mechanisms, clinical characteristics, and diagnostic-therapeutic strategies of this condition, with particular focus on evaluating the efficacy and safety of conservative pharmacological management. By summarizing case features and individualized treatment protocols, this study aims to provide clinical references for early identification, accurate diagnosis, and rational intervention of UAVF, thereby reducing risks of massive hemorrhage and long-term complications while improving patient prognosis.

【Key words】 Uterine arteriovenous fistula; Abnormal uterine bleeding; Drug therapy; Ultrasonography; Hysteroscopic operation

个案报道

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宫内妊娠合并剖宫产瘢痕妊娠行选择性减胎术 1 例报道

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【摘要】 为评估妊娠早期行选择性减胎术治疗宫内妊娠合并剖宫产瘢痕妊娠(combined intrauterine and cesarean scar pregnancy, CI-CSP)的临床效果, 本文报道 1 例经辅助生殖技术助孕后确诊为 CI-CSP 的 41 岁孕妇, 于孕 6 周在超声引导下采取机械性减胎术减灭瘢痕部位胎儿, 顺利减胎成功, 宫内妊娠持续至孕

38 周，剖宫产娩出一健康男婴。本案例提示，选择性减胎术可作为保留宫内妊娠、降低 CI-CSP 风险的可行方案，但需严格把握适应证及加强围术期管理。

【关键词】 生殖技术， 辅助； 宫内妊娠合并剖宫产瘢痕妊娠； 选择性减胎术

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Selective fetus reduction in a case of combined intrauterine and cesarean scar pregnancy: a case report

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【Abstract】 To evaluate the clinical efficacy of selective fetal reduction in the first trimester for the treatment of intrauterine pregnancy combined with cesarean scar pregnancy (CI-CSP), this article reports a 41-year-old pregnant woman diagnosed with CI-CSP after assisted reproductive technology. At 6⁺ weeks of gestation, mechanical fetal reduction surgery was performed under ultrasound guidance to eliminate the fetus at the scar site, and the fetal reduction was successful. The pregnancy lasted until 38 weeks of gestation. A healthy male infant was delivered by cesarean section. This case suggests that selective fetal reduction surgery can be a feasible option to preserve intrauterine pregnancy and reduce the risk of CI-CSP, but the indications and perioperative management need to be strictly controlled.

【Key words】 Reproductive techniques, assisted; Combined intrauterine and cesarean scar pregnancy; Selective fetus reduction

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综述

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玻璃化冷冻及冷冻次数对早期胚胎表观遗传及发育潜能的影响

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【摘要】 玻璃化冷冻是辅助生殖技术领域重要的胚胎保存方法, 被广泛应用于临床。近年来, 动物模型和临床研究表明, 玻璃化冷冻可能通过改变胚胎表观遗传修饰(如 DNA 甲基化模式和组蛋白修饰)及相关基因表达调控, 从而影响早期胚胎的发育潜能。本文对国内外动物模型与人类临床研究进展进行综述, 重点阐述玻璃化冷冻影响胚胎发育潜能的分子机制, 特别关注二次玻璃化冷冻对胚胎表观遗传及发育潜能的影响, 旨在为玻璃化冷冻技术的临床规范化应用及胚胎安全性评估提供生殖遗传学领域的科学依据和理论参考。

【关键词】 基因表达调控; 玻璃化冷冻; 表观遗传修饰; 胚胎发育潜能

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Effect of vitrification and repeated cryopreservation on epigenetics and developmental potential of early embryos

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【Abstract】 Vitrification is a critical embryo cryopreservation technique extensively employed in assisted reproductive technology clinical practice. Recent evidence from animal models and clinical studies indicates that vitrification may compromise embryonic developmental competence by inducing epigenetic alterations, including dysregulated DNA methylation patterns, aberrant histone modifications, and subsequent disruptions in gene expression regulation. This review systematically summarizes recent advances from both animal and human studies, highlighting molecular mechanisms underlying vitrification-induced changes in embryonic developmental potential, with particular emphasis on epigenetic and developmental consequences of repeated vitrification. The aim of this review is to provide reproductive genetic insights and theoretical references to facilitate standardized clinical application of vitrification procedures and comprehensive assessment of embryo safety.

【Key words】 Gene expression regulation; Vitrification; Epigenetic modifications; Embryo developmental potential

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综述

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体外受精第4天胚胎移植的研究进展

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【摘要】 随着体外受精培养技术的进步, 桑葚胚因经历了重要的致密化阶段, 在选择性胚胎移植中逐渐显现优势。致密化不仅是胚胎结构上的变化, 还涉及细胞间的复杂信号转导, 对胚胎的发育潜力和细胞命运具有重要影响。第4天桑葚胚移植的活产率与第5天囊胚移植相似, 且体外发育时间更短。然而, 第4天移植仍面临评估标准不一和长期安全性未完全明确的挑战。当前的胚胎评估方法主要依赖形态学, 具有主观局限性。通过整合基因检测、代谢分析和时差成像技术, 有望显著提高胚胎选择的准确性。此外, 个性化的胚胎-子宫内膜同步性评估, 如子宫内膜容受性分析, 可为制定精准的移植方案提供支持。本文围绕第4天胚胎移植, 系统综述其胚胎发育过程、胚胎评估方案、移植结局比较及冻融胚胎移植研究进展, 旨在全面深化对第4天胚胎移植的认识, 促进其成为个性化生殖医学的重要选择, 实现更高的临床成功率和安全性。

【关键词】 桑葚胚; 胚胎致密化; 第4天胚胎移植; 第4天胚胎评级; 子宫内膜种植窗

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Advances in day 4 embryo transfer for *in vitro* fertilization

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【Abstract】 With advancements in *in vitro* culture techniques, the morula has emerged as a promising candidate for selective embryo transfer due to its critical compaction phase. The compaction process involves not only structural reorganization but also complex intercellular signaling mechanisms that significantly influence embryonic developmental potential and cellular fate determination. Clinical data reveal comparable live birth rates between day 4 morula transfers and day 5 blastocyst transfers, coupled with reduced *in vitro* culture duration. However, challenges persist regarding standardized evaluation criteria and long-term safety confirmation. Current morphological assessment methods exhibit inherent subjectivity, while emerging technologies integrating genetic screening, metabolic analysis, and time-lapse imaging show potential for enhanced selection accuracy. Personalized synchronization assessments, including endometrial receptivity analysis, may further optimize transfer protocols. This study focuses on day 4 embryo transfer, systematically reviewing its embryonic development processes, evaluation protocols, comparative outcomes of transferred embryos, and research advances in frozen-thawed embryo transfer. The study aims to deepen scientific understanding of day 4 embryo transfer and promote its adoption as a critical option in personalized reproductive medicine, thereby enhancing clinical success rates and safety.

【Key words】 Morula; Embryo compaction; Day 4 embryo transfer; Day 4 embryo grading; Endometrial implantation window

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综述

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孕酮诱导封闭因子在妊娠方面的研究进展

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【摘要】 孕酮诱导封闭因子 (progesterone-induced blocking factor, PIBF) 是由母体活化淋巴细胞、蜕膜细胞及滋养层细胞分泌的免疫调节蛋白。它主要通过抑制自然杀伤细胞活性、诱导 2 型辅助 T 细胞免疫应答维持母胎界面免疫平衡。此外, PIBF 作为孕酮信号通路下游的核心效应分子, 与子宫内膜细胞增殖及蜕膜化、滋养层细胞合体化及胎盘血管化密切相关。PIBF 介导的母胎界面免疫平衡及子宫内膜容受性在妊娠中发挥重要作用。本文围绕 PIBF 与妊娠相关问题进行综述, 以期更好地指导临床工作。

【关键词】 孕酮诱导封闭因子; 子宫内膜容受性; 妊娠; 免疫平衡

基金项目: 广西医疗卫生重点 (培育) 学科项目 (2022); 广西壮族自治区卫生健康委员会自筹研究项目 (Z-C20240868)

Research progress of progesterone-induced blocking factor in pregnancy

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【 Abstract 】 Progesterone-induced blocking factor (PIBF) is an immunomodulatory protein secreted by maternal activated lymphocytes, decidual cells and trophoblast cells. It mainly maintains the immune balance at the maternal-fetal interface by inhibiting natural killer cell activity and inducing type 2 helper T cell immune response. In addition, PIBF, as the core effector molecule downstream of progesterone signaling pathway, is closely related to endometrial proliferation and decidualization, trophoblast cell syncytialization and placental vascularization. PIBF plays an important role in pregnancy by regulating maternal-fetal interface immune balance and endometrial receptivity. In this article, we reviewed the issues related to PIBF and pregnancy, with the aim of providing better guidance for clinical work.

【 Key words 】 Progesterone-induced blocking factor; Endometrial receptivity; Pregnancy; Immune balance

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免疫微环境在多囊卵巢综合征中的研究进展

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【摘要】 免疫微环境在维持卵巢稳态中发挥关键作用, 而多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 作为一种常见的内分泌代谢紊乱疾病, 其发病与免疫微环境失衡密切相关。本文系统阐述了巨噬细胞、自然杀伤细胞、树突状细胞等先天免疫细胞和 Th1、Th2、调节性 T (regulatory T, Treg)、Th17 等适应性免疫细胞在 PCOS 患者中的异常变化及其对卵巢功能、胰岛素抵抗、高雄激素血症等的影响, 揭示了免疫微环境紊乱在 PCOS 发病中的核心地位。同时, 探讨了肠道菌群失调与 PCOS 的关联, 指出肠道菌群通过影响代谢产物和激素水平参与 PCOS 的发病机制。此外, 还详细介绍了针对免疫微环境失衡的治疗策略, 包括调节巨噬细胞极化、恢复 Th1/Th2 和 Th17/Treg 平衡、改善肠道菌群失调等, 为 PCOS 患者的免疫治疗提供了新的思路 and 方向。综上, 本文从免疫微环境角度全面解析 PCOS 的发病机制, 旨在为未来相关研究和临床实践提供理论依据和参考。

【关键词】 免疫微环境; 多囊卵巢综合征; 先天性免疫; 适应性免疫; 肠道菌群

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Research advances in the immune microenvironment in polycystic ovary syndrome

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【 Abstract 】 The immune microenvironment plays a pivotal role in maintaining ovarian homeostasis. Polycystic ovary syndrome (PCOS), a common endocrine and metabolic disorder, is closely associated with immune microenvironment imbalance. This review systematically describes the dysregulation of innate immune cells (e.g., macrophages, natural killer cells and dendritic cells) and adaptive immune cells (e.g., Th1, Th2, Treg and Th17) in PCOS, highlighting their impacts on ovarian function, insulin resistance, and hyperandrogenemia. These findings underscore the central role of immune microenvironment disturbances in PCOS pathogenesis. Additionally, the

association between gut microbiota dysbiosis and PCOS is explored, emphasizing how gut microbiota influences metabolic byproducts and hormonal levels to contribute to PCOS development. Furthermore, therapeutic strategies targeting immune microenvironment imbalance such as modulating macrophage polarization, restoring Th1/Th2 and Th17/Treg balance, and ameliorating gut microbiota dysbiosis are discussed, offering novel insights for PCOS immunotherapy. In conclusion, this review comprehensively analyzes the pathogenesis of PCOS from the perspective of the immune microenvironment, aiming to provide a theoretical foundation and reference for future research and clinical practice.

【 Key words 】 Immune microenvironment; Polycystic ovary syndrome; Innate immunity; Adaptive immunity; Gut microbiota

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