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· 特约专论 ·

人类“卵子库”建设述评

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【摘要】 利用低温冷冻技术储存卵母细胞或卵巢皮质作为女性生育力保存的“卵子库”, 是辅助生殖技术的项目之一, 其临床应用范围包括恶性肿瘤患者的生育力保存、卵母细胞的捐赠、非医疗原因的生育储备等, 具有重要的医学和社会意义。本文通过评述“卵子库”建设的技术进展、临床应用、伦理问题, 为在我国建立优质、高效、安全、合法的“卵子库”提供专家建议。

【关键词】 人类卵子库; 卵子冷冻; 生育力保存; 卵母细胞捐赠

基金项目: 国家自然科学基金(81730041); 国家重点研发项目(2018YFC100258); 江苏省卫生厅项目(YXZXB2016001)

Commentary on the construction of human "egg bank" in China

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【Abstract】 Using cryopreservation technology to store oocytes or ovarian cortex as an "egg bank" for female fertility preservation is one of the projects of assisted reproductive technology. Clinical applications of "egg bank" include fertility preservation for patients with malignant tumor, oocyte donation, fertility reserve for non-medical reasons, etc., which has important medical and social significances. This paper reviews the technologic development, clinical application and ethical issues of "egg bank", hoping to present expert suggestions for establishing a high quality, efficient, safety and legal "egg bank" in China.

【Key words】 Human egg bank; Oocyte freezing; Fertility preservation; Oocyte donation

Fund program: National Natural Science Foundation of China (81730041); National Key Research and Development Project (2018YFC100258); Project of Jiangsu Provincial Department of Health (YXZXB2016001)

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·MDT 专家视角专栏·

子宫腺肌病女性的孕前健康保健

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【摘要】 在针对暂无妊娠意愿或正在备孕的子宫腺肌病女性的孕前健康保健 (preconception care, PCC) 中, 如何评估并减少生殖高危因素, 尚无任何循证医学的证据。在子宫腺肌病影响子宫体 50% 以上时, 或虽然影响子宫体 25%~50%, 但是伴有子宫腔明显变形、内膜菲薄、卵巢储备功能低下等问题时, 生殖功能严重受损, 可以视为严重的生殖高危因素。尽早妊娠和分娩是最理想的生育力保护方案。对子宫肌层区域性解剖结构和子宫内肌层机能的揭示, 有助于评估子宫腺肌病对生殖功能的影响。

【关键词】 孕前健康保健; 子宫腺肌病; 不孕症; 子宫内肌层; 子宫肌层区域性解剖结构

Preconception care for women with adenomyosis

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【Abstract】 Currently, there is no evidence-based data for evaluating and reducing the reproductive risks in preconception care (PCC) for women with adenomyosis who are not planning to get pregnant or who are preparing for pregnancy. When adenomyosis affects more than 50% of the uterus, or although it affects the uterus by 25%–50%, accompanied with obvious deformation of the cavity, thin endometrium, poor ovarian reservation and other problems; the reproductive function is seriously damaged, which can be regarded as a high risk factor for reproduction. The most ideal fertility preservation option is achieving pregnancy

and giving birth as early as possible. Understanding the regional anatomy of myometrial zone of the uterus and the function of inner uterine myometrium can help to evaluate the impact of adenomyosis on reproductive function.

【 Key words 】 Preconception care; Adenomyosis; Infertility; Inner myometrium; Myometrial zonal anatomy

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·MDT 专家视角专栏·

子宫腺肌病患者保存生育力手术的 难点和焦点及其手术指征探讨

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【摘要】 近年来, 子宫腺肌病患者的生育力低下备受关注, 主要包括不孕、流产、早产、死产、胎儿生长受限、子痫前期以及剖宫产率增加等。目前, 子宫腺肌病不孕患者在药物、高强度聚焦超声等非手术保守性治疗失败后, 往往求助于子宫腺肌病保守性手术病灶切除, 但切除后的临床妊娠成功率与并发症目前一直存在争论。本文就目前子宫腺肌病患者保护生育力手术的难点与焦点以及手术指征进行探讨, 以期临床子宫腺肌病不孕患者的治疗提供参考。

【关键词】 子宫腺肌病; 保守性手术; 生育力保存

Difficulties, focal points and surgical indications of fertility-sparing surgery for patients with adenomyosis

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【 Abstract 】 Recently, the sub-fertility of patients with adenomyosis, including infertility, abortion, premature delivery, stillbirth, fetal growth restriction, preeclampsia and the increase rate of cesarean section, has attracted much attention. Currently, adenomyomectomy is the priority option to treat adenomyosis patients with infertility following the failure of non-surgical conservative treatment of adenomyosis patients with infertility, such as medical therapy and high-intensity

focused ultrasound. However, the clinical pregnancy success rate and complications after conservative surgical surgery for adenomyosis patients with infertility have always been controversial. Here, the difficulties, focal points and surgical indications of fertility-sparing surgery for patients with adenomyosis are put under the microscope, so as to provide reference for the treatment of adenomyosis patients with infertility.

【Key words】 Adenomyosis; Conservative surgery; Fertility preservation

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·MDT 专家视角专栏·

子宫腺肌病不孕患者的药物治疗

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【摘要】 子宫腺肌病合并不孕症女性发病率逐渐升高, 缓解其症状和促进生育是目前临床的棘手问题。多学科诊疗是子宫腺肌病合并不孕症诊治的发展方向, 患者诊治应强调个体化综合治疗。药物治疗可控制病灶、保持子宫完整性、缓解症状、保护生育力, 在子宫腺肌病合并不孕女性的治疗中有其独特的优势。本文就子宫腺肌病不孕患者药物治疗的相关问题展开论述。

【关键词】 子宫腺肌病; 不孕; 药物治疗

Medical treatment of infertile women with adenomyosis

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【Abstract】 The incidence rate of the adenomyosis complicated with infertility in women has gradually increased. For these patients, the current clinical challenge is to alleviate symptoms and promote fertility. In this case, multi-disciplinary treatment is the development direction of adenomyosis complicated with infertility. We emphasize individual comprehensive treatment for these women.

Drug therapy, which can control the focus, maintain the integrity of the uterus, relieve symptoms and protect fertility, has its unique advantages in various treatment methods. This paper discusses the pharmacological methods of infertile patients with adenomyosis.

【Key words】 Adenomyosis; Infertility; Drug therapy

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·临床研究·

国产重组人绒毛膜促性腺激素用于中国女性控制性超促排卵治疗中的有效性与安全性: 一项随机对照研究

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【摘要】 目的 评价国产重组人绒毛膜促性腺激素 (recombinant human chorionic gonadotropin, r-hCG) 用于中国女性辅助生殖技术 (assisted reproductive technology, ART) 控制性超促排卵 (controlled ovarian hyperstimulation, COH) 治疗的有效性与安全性。方法 本试验为多中心、随机、双盲、阳性药平行对照临床研究, 于 2017 年 7 月至 2018 年 10 月期间选取中国 7 家生殖医学中心纳入卵巢

储备功能正常、拟进行 ART-COH 治疗的不孕女性。应用中央随机化系统按照完全随机化原则将受试者随机分为试验组(国产 r-hCG, $n=112$)和对照组(进口 r-hCG, $n=116$), 比较两组受试者 COH 周期中获得卵母细胞数、分裂中期卵母细胞率、卵裂细胞数、双原核受精数、移植周期中血清 hCG 阳性率、早期移植胚胎丢失率、临床妊娠率、持续妊娠率及不良反应发生率等指标。结果 试验组和对照组在 COH 周期中获得的卵母细胞数分别为 (12.1 ± 5.6) 枚和 (12.0 ± 6.7) 枚, 差异无统计学意义 ($P>0.05$); 两组间分裂中期卵母细胞率、卵裂细胞数、双原核受精数、移植周期中血清 hCG 阳性率、早期移植胚胎丢失率、临床妊娠率、持续妊娠率差异均无统计学意义 (均 $P>0.05$), 且两组差值的 90%置信区间 (confidence interval, CI) 均落在预先设定的等效性界值 $(-3, +3)$ 范围内; 两组间免疫原性评估的差异无统计学意义 ($P>0.05$); 治疗期间卵巢过度刺激综合征 (ovarian hyperstimulation syndrome, OHSS) 及其他不良反应发生率差异均无统计学意义 (均 $P>0.05$), 且试验组不良反应均为进口 r-hCG 的已报道的不良反应。结论 在卵巢储备功能正常的中国不孕女性 COH 周期中, 国产 r-hCG 有效性及安全性与进口 r-hCG 相当。

【关键词】 控制性超促排卵; 国产重组人绒毛膜促性腺激素; 有效性; 安全性

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Efficacy and safety of domestic produced recombinant human chorionic gonadotropin in Chinese women undergoing controlled ovarian hyperstimulation

: a randomized controlled trial

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【Abstract】 **Objective** To evaluate the efficacy and safety of domestic recombinant human chorionic gonadotropin (r-hCG) for injection in Chinese women undergoing assisted reproductive technology (ART) of controlled ovarian hyperstimulation (COH). **Methods** In a multicenter, randomized, double-blind, positive, parallel controlled clinical trial, the infertile women with normal ovarian reserve who received COH in seven reproductive medical centers from July 2017 to October 2018 were randomly divided into two groups: experimental group (domestic r-hCG, $n=112$) and control group (imported r-hCG, $n=116$). Interactive

web response system was used to randomize. The total number of oocytes obtained, cleavage cells, two pronuclei fertilization, mid-division oocytes rate, positive serum hCG rate, early embryo loss rate, clinical pregnancy rate, sustained pregnancy rate and the incidence of adverse reactions were compared between the two groups during the cycle of COH. **Results** During the initiation cycle of ovulation induction therapy, the total number of oocytes obtained in experimental group and control group were (12.1 ± 5.6) and (12.0 ± 6.7) respectively, with no statistically significant difference ($P > 0.05$). There were no significant differences in the rate of mid-division oocytes, the number of cleavage cells, the number of double pronuclear fertilization, the positive rate of serum hCG during the transplantation cycle, the loss rate of early embryo, the clinical pregnancy rate, and the sustained pregnancy rate between the two groups (all $P > 0.05$), and the 90% confidence interval (CI) of the difference between the two groups fell within the preset equivalence threshold $(-3, +3)$. The difference in immunogenicity assessment between the two groups was not statistically significant ($P > 0.05$). The incidence of ovarian hyperstimulation syndrome (OHSS) and other adverse reactions in treatment period were not significantly different between the two groups (all $P > 0.05$), which were known adverse reaction occurred in the imported r-hCG. **Conclusion** In the COH cycle of Chinese infertile women with normal ovarian reserve, the effectiveness and safety of domestic r-hCG are equivalent to imported r-hCG.

【Key words】 Controlled ovarian hyperstimulation; Domestic recombinant human chorionic gonadotropin; Efficacy; Safety

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·临床研究·

不同 BMI 患者在 HRT-FET 周期转化 日子宫内膜厚度阈值及最佳内膜厚 度区间分析

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【摘要】 目的 探讨不同体质量指数 (body mass index, BMI) 人群中转化日子宫内膜厚度 (endometrial thickness, EMT) 对激素替代治疗-冻融胚胎移植 (hormone replacement frozen-thawed embryo transfer, HRT-FET) 临床结局的影响, 并分析达到理想临床妊娠率时对应的最佳 EMT 和 EMT 区间。方法 回顾性队列研究分析 2013 年 1 月至 2017 年 12 月期间在河南省人民医院生殖医学中心行激素替代周期 HRT-FET 准备子宫内膜的 10 239 个周期, 根据 BMI 分为低体质量组 ($BMI < 18.5 \text{ kg/m}^2$)、正常体质量组 ($BMI = 18.5 \sim 24.9 \text{ kg/m}^2$)、超重组 ($BMI = 25.0 \sim 29.9 \text{ kg/m}^2$) 和肥胖组 ($BMI \geq 30.0 \text{ kg/m}^2$), 每组再根据 EMT 分为 4 个亚组: $EMT < 8.0 \text{ mm}$ 、 $8.0 \text{ mm} \leq EMT < 10.0 \text{ mm}$ 、 $10.0 \text{ mm} \leq EMT < 12.0 \text{ mm}$ 、 $EMT \geq 12.0 \text{ mm}$, 分别比较各组 BMI 患者各亚组的临床特征及结局指标, 并通过多元回归分析、曲线拟合及阈值效应分析探讨不同 BMI 患者转化日 EMT 对 FET 妊娠结局的影响及达到理想临床妊娠率时对应的 EMT 及 EMT 区间。结果 ①多元回归分析结果显示, 调整混杂因素后, 低体质量组各亚组间随着 EMT 的增加, 临床妊娠率及活产率差异均无统计学意义 (均 $P > 0.05$); 正常体质量组及超重组各亚组间, 随着 EMT 的增加临床妊娠率及活产率均增加明显 (正常体质量组各亚组均 $P < 0.001$, 超重组各亚组 $P = 0.123$ 、 $P = 0.009$ 、 $P = 0.016$; 均 $P < 0.001$); 肥胖组各亚组间随 EMT 增加, 临床妊娠率增加不明显 ($P = 0.449$, $P = 0.279$), 当 $EMT \geq 12.0 \text{ mm}$ 时, 增加明显 ($P = 0.021$), 活产率增加明显, 差异有统计学意义 ($P = 0.014$, $P = 0.005$, $P < 0.001$)。②曲线拟合结果显示, 正常体质量组及超重组 EMT 对临床妊娠率及活产率的影响均呈曲线关系, 即随 EMT 增加, 临床妊娠率先明显上升, 后增速变缓并高水平维持, 再有下降趋势; 低体质量组及肥胖组 EMT 对临床妊娠率及活产率的影响呈直线关系。③根据曲线拟合, 正常体质量组及超重组进行阈值效应分析, 正常体质量组 EMT 对临床妊娠率及活产率影响的内膜拐点为 10.0 mm , EMT 低于 10.0 mm 时, 其每增加 1.0 mm , 临床妊娠率提高 20% ($OR = 1.20$, 95% $CI = 1.13 \sim 1.26$), 活产率提高 19% ($OR = 1.19$, 95% $CI = 1.13 \sim 1.26$); 超重组 EMT 对临床妊娠率及活产率的拐点也为 10.0 mm , 低于 10.0 mm 时, 其每增加 1.0 mm , 临床妊娠率提高 24% ($OR = 1.24$, 95% $CI = 1.13 \sim 1.26$), 活产率提高 26% ($OR = 1.26$, 95% $CI = 1.14 \sim 1.40$)。EMT 超过拐点时, 随 EMT 增加临床妊娠率及活产率增幅不明显。结论 正常体质量组及超重组 EMT 分别在 $10.0 \sim 13.5/10.0 \sim 12.7 \text{ mm}$ 、 $10.0 \sim 14.0/10.0 \sim 12.5 \text{ mm}$ 区间时临床妊娠率及活产率最佳, 子宫内膜过薄或者过厚均影响临床妊娠结局。低体质量组及肥胖组 EMT 对临床妊娠率及活产率影响呈直线关系, 但有待进一步研究。

【关键词】 激素替代; 冻融胚胎移植; 体质量指数; 子宫内膜厚度; 临床妊娠率; 活产率

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Analysis of optimal endometrial thickness and endometrial thickness interval on the first progesterone day measured by trans-vaginal ultrasound in different BMI populations in HRT-FET cycle

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【Abstract】 Objective To investigate the effect of endometrial thickness (EMT) on the clinical outcome of hormone replacement frozen-thawed embryo transfer (HRT-FET) cycle in different body mass index (BMI) groups, and to analyze the threshold and optimal EMT and EMT interval corresponding to the ideal clinical pregnancy rate. **Methods** A retrospective cohort study was conducted on 10 239 HRT-FET cycles in the Reproductive Medicine Center of Henan Provincial People's Hospital from January 2013 to December 2017, and they were divided into low weight group ($BMI < 18.5 \text{ kg/m}^2$), normal weight group ($BMI = 18.5 - 24.9 \text{ kg/m}^2$), overweight group ($BMI = 25.0 - 29.9 \text{ kg/m}^2$) and obese group ($BMI \geq 30.0 \text{ kg/m}^2$). Four subgroups were divided according to EMT, respectively $EMT < 8.0 \text{ mm}$, $8.0 \text{ mm} \leq EMT < 10.0 \text{ mm}$, $10.0 \text{ mm} \leq EMT < 12.0 \text{ mm}$, $EMT \geq 12.0 \text{ mm}$. The clinical characteristics and outcome indicators of different EMT subgroups in different BMI groups were compared. To achieve the ideal clinical pregnancy rate, multiple regression analysis, curve fitting and threshold effect analysis were used to find the best EMT and thickness interval. **Results** 1) After adjusting for confounding factors, multiple regression analysis showed that, there were no significant differences in clinical pregnancy rate and live birth rate among subgroups with the increase of EMT (all groups $P > 0.05$). The clinical pregnancy rate and the live birth rate increased with the increase of EMT between subgroups of normal body weight group and super-recombinant subgroups (all $P < 0.001$ for normal body weight subgroups, $P = 0.123$, $P = 0.009$, $P = 0.016$ and all $P < 0.001$ for super-recombinant subgroups). In the obesity group, with the increase of EMT, the clinical pregnancy rate did not increase significantly except $EMT \geq 12.0 \text{ mm}$ subgroup ($P = 0.449$, $P = 0.279$, $P = 0.021$), while the live birth rate increased significantly ($P = 0.014$, $P = 0.005$, $P < 0.001$). 2) Curve fitting showed that in the population of low weight and obese, influence of EMT on clinical pregnancy rate was a straight line, in the population of normal weight and overweight, influence of EMT on clinical pregnancy rate was a curve, as EMT increased the clinical pregnancy rate raised and then decreased, the impact on the live birth rate appeared similar. 3) According to the curve fitting, the threshold effect analysis of the normal weight group showed that the endometrial inflection point of EMT on the clinical pregnancy rate and the live birth rate was 10.0 mm . When EMT was lower than 10.0 mm , the clinical pregnancy rate and the live birth rate increased by 20% and 19% for every 1.0 mm increase in endometrial thickness ($OR = 1.20$, 95% $CI = 1.13 - 1.26$; $OR = 1.13$, 95% $CI = 1.13 - 1.26$). In overweight group, the inflection point of EMT on the clinical pregnancy rate and the live birth rate was also 10.0 mm . When

EMT was lower than 10.0 mm, the clinical pregnancy rate and the live birth rate increased by 24% and 26% for every 1.0 mm increase in EMT ($OR=1.24$, 95% $CI=1.13-1.26$; $OR=1.26$, 95% $CI=1.14-1.40$). When EMT exceeded 10.0 mm, the clinical pregnancy rate and the live birth rate did not increase significantly with the increase of EMT. **Conclusion** In HRT-FET cycle, the endometrial thickness has an effect on the clinical pregnancy rate and the live birth rate in the normal weight group and the overweight group. The clinical pregnancy rate and the live birth rate were the best when the EMT was between 10.0–13.5/10.0–12.7 mm and 10.0–14.0/10.0–12.5 mm, respectively. Whether the endometrium was too thin or too thick would affect the clinical pregnancy outcome. The influence of EMT on clinical pregnancy rate and live birth rate was linear between the low weight group and the obese group, but further study is needed.

【Key words】 Hormone replacement therapy; Frozen-thawed embryo transfer; Body mass index; Endometrial thickness; Clinical pregnancy rate; Live birth rate

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·临床研究·

体质量指数对多囊卵巢综合征患者体外受精-胚胎移植临床结局的影响

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【摘要】 目的 探讨不同体质量指数 (body mass index, BMI) 对多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 患者体外受精-胚胎移植 (*in vitro* fertilization and embryo transfer, IVF-ET) 临床结局的影响。方法 回顾性队列研究分析 2016 年 1 月至 2018 年 12 月期间在郑州大学第一附属医院生殖医学中心就诊的年龄 < 35 岁首次行 IVF-ET 助孕并采用卵泡期长效长方案的患者临床资料, 共

2982 例, 其中 PCOS 患者 (PCOS 组) 999 例, 单纯因输卵管因素不孕的患者 (非 PCOS 组) 1983 例, 所有患者均排除其他合并症。PCOS 患者再根据 BMI 分为超重 PCOS 组 ($24.0 \text{ kg/m}^2 \leq \text{BMI} < 28.0 \text{ kg/m}^2$) 和正常体质量 PCOS 组 ($18.5 \text{ kg/m}^2 \leq \text{BMI} < 24.0 \text{ kg/m}^2$)。计算并比较各组患者的一般资料、妊娠结局、胚胎发育指标, 分析 BMI 对妊娠结局及胚胎发育潜能的影响, 同时研究新生儿出生体质量与母体 BMI 的相关性。结果 第 3 日 (day 3, D3) 胚胎移植的正常体质量 PCOS 组优质胚胎率 [67.41% (1906/2826)]、囊胚形成率 [56.39% (578/1025)]、优质囊胚形成率 [29.75% (305/1025)] 及可利用胚胎率 [62.14% (1756/2826)] 均高于超重 PCOS 组 [62.65% (1753/2798), $P < 0.001$; 47.30% (457/966), $P < 0.001$; 16.35% (158/966), $P < 0.001$; 59.04% (1652/2798), $P = 0.018$]。第 5 日 (day 5, D5) 囊胚移植的正常体质量 PCOS 组总受精率 [82.38% (1711/2077)]、双原核受精率 [68.03% (1413/2077)]、囊胚形成率 [68.90% (554/804)]、优质囊胚形成率 [62.56% (503/804)] 及可利用胚胎率 [57.16% (802/1403)] 均较超重 PCOS 组高 [80.21% (2954/3683), $P = 0.044$; 64.76% (2385/3683), $P = 0.012$; 63.95% (871/1362), $P < 0.001$; 30.32% (413/1362), $P < 0.001$; 53.03% (1250/2357), $P = 0.014$]、种植率 [66.67% (72/108)]、临床妊娠率 [66.97% (73/109)] 及流产率 [9.59% (7/73)] 均较超重 PCOS 组低 [80.57% (141/175), $P = 0.008$; 80.46% (140/174), $P = 0.011$; 20.71% (29/140), $P = 0.040$]。logistic 回归分析显示 D5 移植的超重 PCOS 患者的临床妊娠率 ($aOR = 1.92$, 95% $CI = 1.049 \sim 3.515$, $P = 0.034$) 及流产率 ($aOR = 3.09$, 95% $CI = 1.209 \sim 7.915$, $P = 0.019$) 分别为正常体质量 PCOS 组的 1.92 及 3.09 倍。Pearson 相关性分析结果显示, D3、D5 移植的 PCOS 患者及 D3 移植的非 PCOS 患者 BMI 与新生儿出生体质量均呈正相关 ($r = 0.144$, $P = 0.013$; $r = 0.212$, $P = 0.004$; $r = 0.137$, $P < 0.001$)。D5 移植的超重 PCOS 患者组新生儿出现巨大儿的概率 ($aOR = 5.33$, 95% $CI = 1.525 \sim 18.597$, $P = 0.009$) 为正常体质量 PCOS 组的 5.33 倍。结论 高 BMI 可能是影响 PCOS 患者胚胎质量及流产率增高的主要因素。超重或肥胖可能会使新生儿出生体质量增加, PCOS 患者在行 IVF 助孕治疗前减重将有助于改善胚胎质量及新生儿出生体质量。

【关键词】 多囊卵巢综合征; 体质量指数; 受精, 体外; 胚胎移植; 胚胎质量; 妊娠结局; 新生儿结局

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Influence of body mass index on clinical outcome of *in vitro* fertilization-embryo transfer in patients with polycystic ovary syndrome

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【Abstract】 **Objective** To observe the outcome of *in vitro* fertilization-embryo transfer (IVF-ET) in patients with polycystic ovary syndrome (PCOS) under different body mass index (BMI). **Methods** A retrospective cohort study was performed on the clinical data of 2982 patients under 35 years old who received the first cycle with adopted long-term follicular phase plan during January 2016 to December 2018 in the Reproductive Medicine Center of the First Affiliated Hospital of Zhengzhou University, including 999 patients with PCOS (PCOS group) and 1983

patients with infertility due to tubal factors alone without other complications (non-PCOS group). Patients in PCOS group were divided into overweight PCOS group ($24.0 \text{ kg/m}^2 \leq \text{BMI} < 28.0 \text{ kg/m}^2$) and normal weight PCOS group ($18.5 \text{ kg/m}^2 \leq \text{BMI} < 24.0 \text{ kg/m}^2$). The general information, pregnancy outcome and embryo development indexes of patients in each group were calculated and compared, and the effects of BMI on pregnancy outcome and embryo development potential were analyzed. Meanwhile, the correlation between newborn birth weight and maternal BMI was studied. **Results** High-quality embryo rate [67.41% (1906/2826)], blastocyst formation rate [56.39% (578/1025)], high-quality blastocyst formation rate [29.75% (305/1025)] and available embryo rate [62.14% (1756/2826)] of normal weight PCOS group were all higher than those of overweight PCOS group [62.65% (1753/2798), $P < 0.001$; 47.30% (457/966), $P < 0.001$; 16.35% (158/966), $P < 0.001$; 59.04% (1652/2798), $P = 0.018$]. Normal weight PCOS group compared with overweight PCOS group transferred on day 5 (D5), total fertilization rate [82.38% (1711/2077)], two pronuclei (2PN) fertilization rate [68.03% (1413/2077)], blastocyst formation rate, high-quality blastocyst formation rate [68.90% (554/804)], and available embryo rate [57.16% (802/1403)] were higher in normal weight PCOS group [80.21% (2954/3683), $P = 0.044$; 64.76% (2385/3683), $P = 0.012$; 63.95% (871/1362), $P < 0.001$; 30.32% (413/1362), $P < 0.001$; 53.03% (1250/2357), $P = 0.014$]. The implantation rate [66.67% (72/108)], the clinical pregnancy rate [66.97% (73/109)] and the miscarriage rate [9.59% (7/73)] in normal weight PCOS group transferred on D5, were higher than those in the overweight PCOS group [80.57% (141/175), $P = 0.008$; 80.46% (140/174), $P = 0.011$; 20.71% (29/140), $P = 0.040$]. The odds of clinical pregnancy rate (aOR=1.92, 95% CI=1.049–3.515, $P = 0.034$) and miscarriage rate (aOR=3.09, 95% CI=1.209–7.915, $P = 0.019$) were increased in the overweight PCOS group transferred on D5. Pearson correlation analysis showed that BMI of D3 and D5 transplanted PCOS patients and D3 transplanted non-PCOS patients were positively correlated with neonatal birth weight ($r = 0.144$, $P = 0.013$; $r = 0.212$, $P = 0.004$; $r = 0.137$, $P < 0.001$), the difference was statistically significant. The odds of macrosomia (aOR=5.33, 95% CI=1.525–18.597, $P = 0.009$) were increased in the overweight PCOS group transferred on D5. **Conclusion** The increase of BMI may be the main factor affecting embryo quality and leading to higher abortion rate in PCOS patients. Being overweight or obese may lead to an increase in birth weight and weight loss in PCOS patients before IVF-ET will improve embryo quality and control newborn birth weight.

【Key words】 Polycystic ovary syndrome; Body mass index; Fertilization *in vitro*; Embryo transfer; Pregnancy outcome; Neonatal outcome

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孕晚期血清松弛素水平与产后盆底功能障碍性疾病及盆底超声参数的相关性研究

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【摘要】 目的 探讨孕晚期血清松弛素水平与产后盆底功能障碍性疾病 (pelvic floor dysfunction, PFD) 和盆底超声参数的相关性。方法 采用病例对照研究, 收集 2017 年 2 月至 2018 年 7 月期间在郑州大学第二附属医院产检的孕妇 348 例, 按照产后是否出现 PFD 将产妇分为病例组 (自然分娩 68 例, 剖宫产 44 例) 和对照组 (自然分娩 134 例, 剖宫产 102 例), 收集同期健康未孕女性 100 例为健康未孕组。检测产妇妊娠 37~40 周的血清松弛素水平和产后 42 d 的盆底超声参数——膀胱尿道后角 (posterior vesicourethral angle, PVA)、膀胱颈移动度 (bladder neck mobility, BNM)、尿道旋转角 (urethral rotation angle, URA)、逼尿肌厚度 (detrusor wall thickness, DWT) 及肛提肌裂口面积 (levator ani hiatus area, LHA); 分别于不同分娩方式下比较病例组和对照组的松弛素差异, 利用 logistic 回归、受试者工作特征 (receiver operator characteristic, ROC) 曲线分析松弛素水平与 PFD 的相关性; 分析松弛素水平与各盆底超声参数之间的相关性。结果 自然分娩方式及剖宫产方式的病例组松弛素水平 [(664.23±69.26) ng/L, (640.10±153.18) ng/L] 均显著高于其对照组 [(443.62±58.79) ng/L, (440.49±87.82) ng/L, 均 $P<0.001$], 且均高于健康未孕组 [(64.86±17.36) ng/L, 均 $P<0.001$]。logistic 多因素分析显示松弛素水平是 PFD 发生的独立危险因素 ($OR=3.931$, 95% $CI=2.330\sim6.628$, $P<0.001$); ROC 曲线分析提示松弛素诊断总体、自然分娩组及剖宫产组的曲线下面积分别为 0.947、0.876 和 0.861; 松弛素水平与超声参数 Valsalva 动作下的 PVA、BNM、URA、静息状态及 Valsalva 动作下的 LHA 之间存在显著正相关性 (分别 $r=0.134$, $P=0.013$; $r=0.108$, $P=0.045$; $r=0.190$, $P=0.001$; $r=0.343$, $P=0.001$; $r=0.261$, $P=0.001$)。结论 妊娠晚期松弛素水平与产后 PFD 发病及超声表现下的严重程度密切相关, 对于产后 PFD 的发病发展有一定提示意义。

【关键词】 松弛素； 盆底功能障碍性疾病； 自然分娩； 剖宫产； 危险因素

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Correlation between serum relaxin level in the late trimester and postpartum pelvic floor dysfunction and pelvic ultrasound parameters

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【Abstract】 Objective To explore the relationship between serum relaxin level in the late pregnancy and the postpartum pelvic floor dysfunction (PFD) and ultrasound parameters of pelvic floor. **Methods** A total of 348 pregnant women who underwent antenatal examination in the Second Affiliated Hospital of Zhengzhou University from February 2017 to July 2018 were collected and divided into case group (68 cases of natural delivery, 44 cases of cesarean section) and control group (134 cases of natural delivery, 102 cases of cesarean section) according to whether PFD occurred after delivery. Totally 100 healthy nulliparous women in the same period were collected as health nulliparous group. The serum relaxin level of pregnant women at 37–40 weeks and the pelvic ultrasound parameters of 42 d postpartum, such as posterior vesicourethral angle (PVA), bladder neck mobility (BNM), urethral rotation angle (URA), detrusor wall thickness (DWT), levator ani hiatus area (LHA) were measured. The relaxin levels between case group and control group were compared under different delivery modes. The correlation between relaxin level and PFD was analyzed by receiver operator characteristic curve (ROC) and logistic regression. The correlation between relaxin level and each ultrasonic parameter was analyzed by correlation analysis. **Results** The relaxin levels of case group under natural delivery and cesarean section [(664.23±69.26) ng/L, (640.10±153.18) ng/L] were both higher than those of control group [(443.62±58.79) ng/L, (440.49±87.82) ng/L, all $P<0.001$], all of which was significantly higher than that of the healthy nulliparous group [(64.85±17.36) ng/L, all $P<0.001$]. Logistic analysis showed that high relaxin level was an independent risk factor for PFD ($OR=3.931$, 95% $CI=2.330-6.628$, $P<0.001$). ROC curve analysis indicated that the area under curve of relaxin diagnosed of PFD in total, natural delivery group and cesarean section were 0.867, 0.876 and 0.861, respectively. There were significant positive correlations between relaxin level and ultrasound parameters PVA under the Valsalva action, BNM, URA, LHA at rest and Valsalva action ($r=0.134$, $P=0.013$; $r=0.108$, $P=0.045$; $r=0.190$, $P=0.001$; $r=0.343$, $P=0.001$; $r=0.261$, $P=0.001$; respectively). **Conclusion** The level of relaxin in the third trimester of pregnancy is closely related to the incidence and severity of postpartum PFD, which has some implications for the incidence and progression of PFD.

【Key words】 Relaxin; Pelvic floor dysfunction; Natural delivery; Cesarean section; Risk factor

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·实验研究·

邻苯二甲酸二丁酯通过 AMPK/mTOR 信号通路对大鼠睾丸 间质细胞凋亡的影响及其机制研究

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【摘要】 目的 探讨邻苯二甲酸二丁酯(dibutyl phthalate, DBP)通过腺苷酸活化蛋白激酶/哺乳动物雷帕霉素靶蛋白(AMP activated protein kinase/mammalian rapamycin target protein, AMPK/mTOR)信号通路对大鼠睾丸间质细胞(Leydig)凋亡的影响。方法 生殖功能损伤大鼠模型按照体质量排序分组法分为模型(DBP)组17只、模型+AMPK抑制剂[DBP+化合物C(compound C, CC)]组17只、模型+AMPK激动剂[DBP+二甲双胍(metformin, MF)]组17只、DBP+AMPK抑制剂+激动剂(DBP+CC+MF)组17只。另取11只大鼠作为空白组。空白组和DBP组腹腔注射等量生理盐水, DBP+CC组、DBP+MF组分别腹腔注射20 mg/kg CC、200 mg/kg MF, DBP+CC+MF组腹腔注射20 mg/kg CC+200 mg/kg MF, qd, 连续4周。放射性免疫分析法检测各组血清黄体生成素(luteinizing hormone, LH)、卵泡刺激素(follicle-stimulating hormone, FSH)、睾酮水平;全自动精子质量分析系统分析精子质量;HE染色法观察睾丸生精小管上皮细胞病变情况;末端脱氧核糖核苷酸转移酶介导的dUTP缺口末端标记(terminal deoxynucleotidyl transferase-mediated dUTP-biotin nick end labeling, TUNEL)法

和流式细胞术检测 Leydig 细胞凋亡情况；RT-PCR 法和 Western blotting 法检测 AMPK、mTOR、半胱氨酸天冬氨酸蛋白酶 3(Caspase 3)mRNA 和蛋白及 p-AMPK、p-mTOR 蛋白的表达。结果 与 DBP 组的血清 FSH 水平 $[(9.07 \pm 0.52) \text{ U/L}]$ 相比，DBP+MF 组血清 FSH 水平 $[(9.88 \pm 0.67) \text{ U/L}]$ 升高，DBP+CC 组 $[(6.82 \pm 0.60) \text{ U/L}]$ 降低，差异均有统计学意义（均 $P < 0.001$ ）；与 DBP 组血清 LH、睾酮水平、精子浓度及(a+b)级精子占比 $[(4.51 \pm 0.75) \text{ U/L}、(3.25 \pm 0.11) \text{ mg/L}、(16.46 \pm 3.40) \times 10^6/\text{mL}、(25.43 \pm 4.36) \%$] 相比，DBP+MF 组血清 LH、睾酮水平及精子浓度、(a+b) 级精子占比 $[(3.97 \pm 0.70) \text{ U/L}、(2.96 \pm 0.11) \text{ mg/L}、(13.15 \pm 2.63) \times 10^6/\text{mL}、(22.20 \pm 4.13) \%$] 降低，DBP+CC 组 $[(6.52 \pm 0.71) \text{ U/L}、(4.48 \pm 0.15) \text{ mg/L}、(25.47 \pm 2.18) \times 10^6/\text{mL}、(45.60 \pm 4.78) \%$] 升高，差异均有统计学意义（DBP 组比 DBP+MF 组 $P_{\text{LH}}=0.038$ ，其余均 $P < 0.001$ ）。HE 染色显示，空白组睾丸组织结构正常；DBP 组和 DBP+CC+MF 组生精小管上皮细胞萎缩、扭曲呈不规则形态，DBP+MF 组病变更为严重，核周现大量空泡；DBP+CC 组病变较 DBP 组有所改善。与 DBP 组 Leydig 细胞凋亡数、p-AMPK/AMPK 蛋白及 Caspase 3 mRNA 和蛋白相对表达量 $(142.40 \pm 26.78、0.70 \pm 0.07、1.85 \pm 0.14、0.80 \pm 0.09)$ 相比，DBP+MF 组 Leydig 细胞凋亡数、p-AMPK/AMPK 及 Caspase 3 mRNA 和蛋白相对表达量 $(286.60 \pm 30.17、0.95 \pm 0.08、2.17 \pm 0.18、1.23 \pm 0.10)$ 升高，DBP+CC 组 $(88.00 \pm 21.34、0.42 \pm 0.04、1.35 \pm 0.15、0.54 \pm 0.06)$ 降低，差异均有统计学意义（均 $P < 0.001$ ）；与 DBP 组 p-mTOR/mTOR (0.45 ± 0.06) 相比，DBP+MF 组 (0.23 ± 0.04) 降低，DBP+CC 组 (0.84 ± 0.07) 升高（均 $P < 0.001$ ）。结论 DBP 可致大鼠生殖系统受损，Leydig 细胞凋亡率升高，其机制可能与 AMPK 活化、mTOR 抑制有关。

【关键词】 生殖； 睾丸； 间质细胞； 凋亡； 邻苯二甲酸二丁酯

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Effects and mechanism of dibutyl phthalate on apoptosis of rat Leydig cells through AMPK/mTOR signaling pathway

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【Abstract】 Objective To explore the effect of dibutyl phthalate (DBP) on the rat testis Leydig cell apoptosis by AMP activated protein kinase/mammalian rapamycin target protein (AMPK/mTOR) signaling pathway. **Methods** Rats with reproductive function impairment were divided into model (DBP) group of 17 rats, model+AMPK inhibitor [DBP+compound C (CC)] group of 17 rats, model+AMPK agonist [DBP+metformin (MF)] group of 17 rats, DBP+AMPK inhibitor+agonist (DBP+CC+MF) group of 17 rats by body mass ranking grouping method. Another 11 rats were taken as the blank group. The blank group and DBP group were intraperitoneally injected with the same amount of normal saline, while DBP+CC group and DBP+MF group were intraperitoneally injected with 20 mg/kg CC and 200 mg/kg MF respectively, and DBP+CC+MF group was intraperitoneally injected with CC and MF once a day for 4 weeks. Luteinizing hormone (LH), follicle-stimulating hormone (FSH) and testosterone (T) were measured by radioimmunoassay. Sperm

quality was analyzed by automatic sperm quality analysis system. Leydig cell apoptosis was detected by terminal deoxynucleotidyl transferase-mediated dUTP-biotin nick end labeling (TUNEL) and flow cytometry. The expressions of *AMPK*, *mTOR*, *Caspase 3* mRNA and protein, p-AMPK and p-mTOR protein were detected by RT-PCR and Western blotting. **Results** The serum level of FSH in DBP+MF group $[(9.88\pm0.67) \text{ U/L}]$ increased, while that in DBP+CC group $[(6.82\pm0.60) \text{ U/L}]$ decreased compared with DBP group $[(9.07\pm0.52) \text{ U/L}]$ (all $P<0.001$). The serum LH, T levels and sperm concentration, percentage of (a+b) grade sperm in DBP+MF group $[(3.97\pm0.70) \text{ U/L}, (2.96\pm0.11) \text{ mg/L}, (13.15\pm2.63)\times10^6/\text{mL}, (22.20\pm4.13)\%]$, DBP+CC group $[(6.52\pm0.71) \text{ U/L}, (4.48\pm0.15) \text{ mg/L}, (25.47\pm2.18)\times10^6/\text{mL}, (45.60\pm4.78)\%]$ increased compared with DBP group $[(4.51\pm0.75) \text{ U/L}, (3.25\pm0.11) \text{ mg/L}, (16.46\pm3.40)\times10^6/\text{mL}, (25.43\pm4.36)\%]$ (DBP group vs. DBP+MF group $P_{\text{LH}}=0.038$, the other all $P<0.001$). HE staining showed that the structure of testis in blank group was normal. In DBP group and DBP+CC+MF group, the epithelial cells of seminiferous tubules atrophied and twisted in irregular shape, and the disease became serious in DBP+MF group, and there were a lot of vacuoles around the nucleus. The number of apoptosis, p-AMPK/AMPK protein relative expression and *Caspase 3* mRNA and protein relative expression of Leydig cells in DBP+MF group $(286.60\pm30.17, 0.95\pm0.08, 2.17\pm0.18, 1.23\pm0.10)$ increased, and DBP+CC group $(88.00\pm21.34, 0.42\pm0.04, 1.35\pm0.15, 0.54\pm0.06)$ decreased compared with those in DBP group $(142.40\pm26.78, 0.70\pm0.07, 1.85\pm0.14, 0.80\pm0.09)$, all $P<0.001$. Compared with DBP group (0.45 ± 0.06) , the p-mTOR/mTOR of DBP+MF group (0.23 ± 0.04) decreased, and the p-mTOR/mTOR of DBP+CC group (0.84 ± 0.07) increased (all $P<0.001$). **Conclusion** DBP can damage the reproductive system of rats and increase the apoptosis rate of Leydig cells, which may be related to AMPK activation and mTOR inhibition.

【Key words】 Reproduction; Testis; Interstitial cells; Apoptosis; Dibutyl phthalate

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·临床报道·

多次经阴道穿刺抽吸腹水对重度卵巢过度刺激综合征患者治疗结局的影响

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【摘要】 目的 探讨多次经阴道穿刺抽吸腹水在重度卵巢过度刺激综合征 (ovarian hyperstimulation syndrome, OHSS) 合并张力性腹水处理中的临床效果。方法 选取成都市妇女儿童中心医院生殖中心 2010 年 6 月至 2020 年 7 月期间行助孕取卵术后发生重度 OHSS 并经阴道穿刺抽吸腹水的 186 例患者进行回顾性队列研究,按腹水抽吸次数不同分为单次抽吸组 ($n=116$) 和多次抽吸组 ($n=70$)。两组患者均进行了补液、扩容及抗凝治疗。比较两组患者补液总量、白蛋白及低分子肝素用量、住院时间及并发症发生情况,并通过多元 logistic 回归分析患者的满意度。结果 多次抽吸组腹水抽液总量 [(6.89 ± 1.24) L] 明显高于单次抽吸组 [(3.09 ± 0.65) L], 差异有统计学意义 ($P<0.001$); 单次抽吸组补液总量 [$(12\ 965.52\pm 3\ 796.29)$ mL]、白蛋白输入量 [(131.77 ± 45.38) g] 及低分子肝素注射总量 [$(53\ 017.24\pm 12\ 629.84)$ U] 与多次抽吸组 [$(9\ 485.71\pm 3\ 470.34)$ mL、 (94.57 ± 47.91) g、 $(38\ 071.43\pm 12\ 490.37)$ U] 对比, 差异均有统计学意义 (均 $P<0.001$); 多次抽吸组住院时间 [(8.01 ± 2.66) d] 明显短于单次抽吸组 [(10.81 ± 2.65) d], 差异有统计学意义 ($P<0.001$); 多次抽吸组术后并发症发生率与单次抽吸组比较, 差异无统计学意义 ($P>0.05$)。多元 logistic 回归结果显示, 抽吸次数不是影响患者满意度的重要因素 [$OR=0.593$ (95% $CI=0.134\sim 2.623$), $P=0.491$], 白蛋白用量和住院时间是影响患者满意度的重要因素 [$OR=0.868$ (95% $CI=0.757\sim 0.996$), $P=0.043$; $OR=0.389$ (95% $CI=0.154\sim 0.979$), $P=0.045$]。结论 经阴道多次穿刺抽吸腹水对于合并反复张力性腹水的重度 OHSS 患者能迅速缓解症状, 缩短治疗时间, 减少用药量, 是一种安全有效的治疗方法。

【关键词】 卵巢过度刺激综合征; 重度; 腹水; 经阴道抽吸

Effect of multiple transvaginal puncture-aspiration of ascites on the therapeutic outcome of severe ovarian hyperstimulation syndrome patients

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【 Abstract 】 Objective To explore the clinical effect of multiple transvaginal puncture-aspiration for ascites drainage on the management of severe ovarian hyperstimulation syndrome (OHSS) combined with tense ascites. **Methods** From June 2010 to July 2020, 186 cases who developed severe OHSS after oocyte collection and received ascites puncture at Department of Reproductive Medicine of Chengdu Women's and Children's Central Hospital were collected and divided into

single aspiration group ($n=116$) and multiple aspiration group ($n=70$) according to the different ascites aspiration times. Patients in both groups were given fluid infusion, expansion and anticoagulant therapy. Then, the therapeutic outcomes between the two groups were compared. **Results** The ascites volume in multiple aspiration group $[(6.89\pm 1.24) \text{ L}]$ was apparently higher than that in single aspiration group $[(3.09\pm 0.65) \text{ L}]$, the difference was of statistical significance ($P<0.001$). The differences of the total fluid infusion volume $[(12\ 965.52\pm 3\ 796.29) \text{ mL vs. } (9\ 485.71\pm 3\ 470.34) \text{ mL}]$, the albumin infusion volume $[(131.77\pm 45.38) \text{ g vs. } (94.57\pm 47.91) \text{ g}]$, the total low-molecular-weight heparin (LMWH) volume $[(53\ 017.24\pm 12\ 629.84) \text{ U vs. } (38\ 071.43\pm 12\ 490.37) \text{ U}]$ between single aspiration group and multiple aspiration group were statistically significant (all $P<0.001$). Moreover, the length of hospital stay in multiple aspiration group was $(8.01\pm 2.66) \text{ d}$, which was markedly shorter than that in single aspiration group $[(10.81\pm 2.65) \text{ d}]$, and the difference was statistically significant ($P<0.001$). The difference of the postoperative complication rate between multiple aspiration group and single aspiration group was not statistically significant ($P>0.05$). Multivariate logistics results showed that the number of aspiration was not an important factor affecting patients' satisfaction [$OR=0.593(95\% \text{ CI}=0.134-2.623)$, $P=0.491$], while the amount of albumin and length of hospital stay were important factors affecting patients' satisfaction [$OR=0.868(95\% \text{ CI}=0.757-0.996)$, $P=0.043$; $OR=0.389(95\% \text{ CI}=0.154-0.979)$, $P=0.045$]. **Conclusion** Multiple transvaginal puncture-aspiration of ascites can rapidly relieve the symptoms in patients with severe OHSS combined with repeated tense ascites, shorten the time of treatment and reduce the dosage, which is a safe and effective therapeutic method.

【 Key words 】 Ovarian hyperstimulation syndrome; Severe; Ascites; Transvaginal aspiration

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·临床报道·

绝经激素治疗对 40~65 岁女性绝经综合征改善的回顾性队列研究

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【摘要】 目的 探讨绝经激素治疗对 40~65 岁女性绝经综合征与生活质量的改善情况。方法 回顾性队列研究分析 2010 年 4 月至 2019 年 11 月期间就诊于上海交通大学附属第六人民医院妇产科更年期门诊 40~65 岁患者的临床资料, 采用绝经期评分表 (menopause rating scale, MRS) 评价患者的绝经综合征及其严重程度的影响。评估时间分别为绝经激素治疗前以及治疗后 3、6、12 个月。结果 在接受绝经激素治疗前以及治疗后 3、6、12 个月, 患者 MRS 总分分别为 9.25、5.25、4.67 和 4.25。与基线水平比较, 绝经激素治疗后患者 MRS 总分显著下降 (均 $P<0.001$)。此外, 治疗后, 50~54 岁组 MRS 分值下降幅度显著高于 40~44 岁组 ($P=0.043$), 而研究对象的其他特征, 如婚姻、收入、体质指数等, 与 MRS 分值下降无关 (均 $P>0.05$)。结论 绝经激素治疗能够显著改善 40~65 岁女性的绝经综合征, 其中对于 50~54 岁组效果优于 40~44 岁组。

【关键词】 绝经激素治疗; 绝经; 年龄分布; 生活质量

A retrospective cohort study on menopause hormone therapy: menopause syndrome improvement in women aged 40 to 65 years

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【Abstract】 Objective To investigate the impact of menopause hormone therapy (MHT) on life quality improvement in women aged 40–65 years who suffered from menopausal syndrome. **Methods** A retrospective cohort study was performed to analyze the clinical data of patients aged 40–65 years attending the menopause clinic of the Department of Obstetrics and Gynecology, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, between April 2010 and November 2019. The menopause rating scale (MRS) was implemented to evaluate the scale and severity of menopausal syndrome. **Results** The total MRS scores were 9.25, 5.25, 4.67 and 4.25 before and 3, 6 and 12 months after menopausal hormone therapy, respectively. Compared with baseline, MRS score decreased significantly after menopausal hormone therapy (all $P<0.001$). Furthermore, After treatment, the decrease of MRS score in 50–54 years old group was significantly higher than that in 40–44 years old group ($P=0.043$). Other characteristics such as marriage, income and body mass index, were not associated with the decrease of MRS score (all $P>0.05$). **Conclusion** MHT can significantly improve menopausal syndrome in women aged 40 to 65 years, and the effect in 50–54 years old group is better than that in 40–44 years old group.

【Key words】 Menopause hormone therapy; Menopause; Age distribution; Quality of life

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·现场调查·

兰州市城区孕产妇叶酸知信行及相关卫生服务 现况分析

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【摘要】 目的 了解兰州市城区孕产妇叶酸知信行及相关卫生服务情况, 为完善此项健康策略提供数据参考。方法 采用横断面研究方法, 以年龄段分层随机选取 2019 年 5 月至 2019 年 12 月期间兰州市部分医疗机构孕检和住院分娩的孕产妇为研究对象, 采用面对面问卷调查法获取叶酸知信行及接受相关卫生服务情况, 通过多因素 logistic 回归分析其影响因素。结果 发放 1060 份问卷, 共收回 1060 份, 其中 1046 份有效问卷, 有效率为 98.70%。兰州市城区孕产妇的叶酸知识知晓率为 79.06%(827/1046), 其中问答叶酸可以预防胎儿神经管畸形的正确率为 89.48%(936/1046)。叶酸服用率为 89.29%(934/1046), 其中孕前开始服用叶酸的孕产妇比例为 48.82%(456/1046), 规范服用叶酸孕产妇比例为 40.04%(374/934)。卫生服务利用方面, 仅 19.91%(186/1046)的孕产妇领取免费叶酸。多因素 logistic 分析结果显示: 文化教育程度为本科以下、家庭月收入 2000~5999 元($OR=4.15$, 95% $CI=1.634\sim10.514$)、认为补充叶酸没有必要($OR=0.14$, 95% $CI=0.045\sim0.433$)、认为目前叶酸政策/宣传没有作用($OR=0.30$, 95% $CI=0.186\sim0.474$)影响叶酸知识知晓率; 孕次为 1 次($OR=4.02$, 95% $CI=1.436\sim11.224$)、有流产史($OR=2.72$, 95% $CI=1.328\sim5.581$)、不知晓叶酸知识($OR=0.16$, 95% $CI=0.100\sim0.249$)、认为补充叶酸没有必要($OR=0.12$, 95% $CI=0.040\sim0.371$)影响叶酸服用率。结论 兰州市城区孕产妇叶酸增补知识、行为有待提高, 除个人、家庭因素外, 现有相关卫生服务状况仍然存在覆盖面窄、宣传不到位、婚前教育缺乏针对性和叶酸发放渠道不通等诸多影响因素。提示应该从提高孕产妇健康意识和因地制宜地加强卫生服务有效性方面完善该地区叶酸增补策略。

【关键词】 叶酸; 知信行; 孕妇; 卫生服务

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Analysis on the status of knowledge, practice and related health services of folic acid among women of childbearing age in Lanzhou City

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【Abstract】 Objective To understand the knowledge, belief, practice and related health services of pregnant and lying-in women in Lanzhou City, provide data reference for improving this health strategy. **Methods** A cross-sectional research method was used to randomly select pregnant and lying-in women who underwent pregnancy examinations and hospitalized deliveries in some medical institutions in Lanzhou City from May 2019 to December 2019 by age group as the research objects. Face-to-face questionnaire surveys were used to obtain folic acid knowledge, behavior and acceptance of related health services, and its influencing factors were analyzed by multivariate logistic regression. **Results** Totally 1060 questionnaires were distributed, and 1060 questionnaires were recovered, of which 1046 were valid questionnaires, with an effective rate of 98.70%. The awareness rate of folic acid knowledge among pregnant and lying-in women in Lanzhou City was 79.06% (827/1046), and the correct rate of question and answer that folic acid could prevent fetal neural tube defects was 89.48% (936/1046). The rate of taking folic acid was 89.29% (934/1046). The proportion of pregnant women who started taking folic acid before pregnancy was 48.82% (456/1046), and the proportion of pregnant women taking folic acid was 40.04% (374/934). In terms of hygienic use, only 19.91% (186/1046) of pregnant women received free folic acid. The results of multivariate logistic analysis showed that education level is below undergraduate degree, family monthly income is 2000–5999 yuan ($OR=4.15$, 95% $CI=1.634-10.514$), folic acid supplementation is not necessary ($OR=0.14$, 95% $CI=0.045-0.433$), it is believed that the current folic acid policy/propaganda has no effect ($OR=0.30$, 95% $CI=0.186-0.474$) affected the awareness rate of folic acid knowledge; pregnancy times are 1 ($OR=4.02$, 95% $CI=1.436-11.224$), has miscarriage history ($OR=2.72$, 95% $CI=1.328-5.581$), no knowledge of folic acid ($OR=0.16$, 95% $CI=0.100-0.249$), folic acid supplementation is not necessary ($OR=0.12$, 95% $CI=0.040-0.371$) affected the rate of taking folic acid. **Conclusion** In Lanzhou, maternal folic acid supplementary knowledge, concepts, and behaviors need to be improved. Except for personal and family factors, the existing related health services still have narrow coverage, insufficient publicity, lack of targeted pre-marital education, and unavailable folic acid distribution channels. It is suggested that the folic acid supplementation strategy should be improved in terms of improving the health awareness of women of childbearing age and improving the effectiveness of health services according to local conditions.

【Key words】 Folate; Knowledge-attitude-behavior; Maternal; Health services

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·个案报道·

单角子宫伴异位输卵管妊娠合并异位肾 1 例

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【摘要】 目的 探讨单角子宫、卵巢输卵管异位以及异位输卵管妊娠的诊断及治疗。方法 分析 1 例就诊于山西省中医院的单角子宫无残角合并卵巢输卵管异位位于髂血管区且对侧肾异位于盆腔, 同时异位的输卵管妊娠的病例资料并文献复习。结果 B 超提示该患者生殖泌尿系畸形及异位妊娠可能, 术中证实为单角子宫、左侧输卵管卵巢异位位于左侧髂血管区、异位输卵管妊娠, 输卵管无破口, 手术切除异位输卵管, 及时手术避免了异位输卵管妊娠破裂出血和髂血管区出血的风险。结论 生殖泌尿系统畸形合并异位妊娠时, 超声是可靠的诊断方法, 应该警惕异位的卵巢输卵管妊娠的可能, 及时手术是异位输卵管妊娠的关键治疗方法。

【关键词】 异位输卵管妊娠; 单角子宫; 异位肾; 卵巢异位

A case of unicornuate uterus with ectopic tubal pregnancy and ectopic kidney

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【Abstract】 Objective To discuss the diagnosis and treatment of unicornuate uterus, ovarian tubal ectopic and ectopic tubal pregnancy. **Methods** A case of unicornuate uterus with no residual horns, ovarian tubal ectopic in the iliac vascular area, contralateral renal ectopic in the pelvic cavity, and ectopic tubal pregnancy who was diagnosed by Shanxi Traditional Chinese Medical Hospital was analysed, and the literature was reviewed. **Results** B-ultrasound indicated the possibility of genitourinary tract malformation and ectopic pregnancy. During the

operation, it was confirmed that the unicornuate uterus, the left fallopian tube and the ovary were located in the left iliac vascular area, and the ectopic tubal pregnancy. Timely operation avoided rupture and bleeding of the ectopic tubal pregnancy and the danger of bleeding in the iliac vascular area. **Conclusion** When genitourinary system malformations are complicated with ectopic pregnancy, ultrasound is a reliable diagnostic method, and attention should be paid to the possibility of ectopic ovarian tubal pregnancy. Timely surgery is the key treatment method for ectopic tubal pregnancy.

【Key words】 Ectopic tubal pregnancy; Unicornuate uterus; Ectopic kidney; Ectopic ovary

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·综述·

辅助生殖技术对子代表观遗传影响的研究进展

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【摘要】 辅助生殖技术 (assisted reproductive technology, ART) 是治疗不孕症的有效方法, 但其安全性值得关注。控制性促排卵作用于卵母细胞印记基因完成重编程的时期, 胚胎的体外培养作用于印记基因去甲基化的敏感时期。卵胞质内单精子注射 (intracytoplasmic sperm injection, ICSI) 操作会影响基因组、印记基因广泛擦除、印记重建及维持。配子及胚胎冷冻可能会导致基因表达紊乱, 印记基因疾病发生的风险增加。ART 过程中的非生理性操作是否会影响胚胎的表观遗传调控程序并进一步遗传给下一代, 需要进一步探索, 本文就 ART 对子代表观遗传的影响进行综述。

【关键词】 生殖技术, 辅助; 表观遗传; DNA 甲基化; 印记基因; 胚胎发育

Research progress on the effects of assisted reproductive technology to offspring epigenetics

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【Abstract】 Although assisted reproductive technology (ART) is an effective method for infertility treatment, its safety deserves great attention. Controlled ovulation stimulation is carried out in the period when the oocyte imprinting gene completes reprogramming, and the *in vitro* culture of the embryo acts on the sensitive period of imprinting gene demethylation. Intracytoplasmic sperm injection (ICSI) operation will affect the genome, imprinting gene extensive erasure, imprinting reconstruction and maintenance. Gamete and embryo freezing may lead to gene expression disorder, and increase the risk of imprinting genetic diseases. Whether the non-physiological manipulation in ART process will affect the embryos epigenetic regulation program and be further inherited to the next generation needs further investigation. This article reviewed the effects of ART on the epigenetic inheritance of offspring.

【Key words】 Reproductive technique, assisted; Epigenesis, genetic; DNA methylation; Imprinted genes; Embryonic development

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·综述·

AMH 在女性非辅助生殖领域的最新临床应用进展

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【摘要】 抗苗勒管激素 (anti-Müllerian hormone, AMH) 作为转化生长因子 β 超家族的成员之一, 在女性体内随着年龄的变化而增减, 并在两性分化中发挥

重要作用。目前, AMH 已成熟运用于辅助生殖领域, 但在非辅助生殖领域的运用较少。本文就 AMH 在非辅助生殖领域的最新临床应用进展做简单综述, 包括辅助诊断多囊卵巢综合征、预测女性绝经年龄、辅助诊断与治疗女性肿瘤、保存生育力、避孕及预测生育预后。

【关键词】 抗苗勒管激素; 临床应用; 非辅助生殖

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The latest clinical application progress of anti-Müllerian hormone in the field of non-assisted reproduction

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【 Abstract 】 Anti-Müllerian hormone (AMH), as a member of the transforming growth factor- β superfamily, changes with age in women and plays an important role in sexual differentiation. Up to now, AMH has been maturely used in the field of assisted reproduction, but it is less used in the field of non-assisted reproduction. This article briefly reviews the latest clinical application progress of AMH in the field of non-assisted reproduction, including assisted diagnosis of polycystic ovary syndrome, prediction of menopause age, assisted diagnosis and treatment of female tumors, preservation of fertility, contraception and prediction of fertility prognosis.

【 Key words 】 Anti-Müllerian hormone; Clinical application; Non-assisted reproduction

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·综述·

长链非编码 RNA 在卵巢综合征中的作用及分子机制

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【摘要】 多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 是一种累及 5%~20% 育龄妇女的生殖内分泌和代谢紊乱性疾病,是导致无排卵性不孕的主要原因。PCOS 的临床表现具有明显的复杂性和异质性,其发病机制尚未明确。长链非编码 RNA (long non-coding RNA, lncRNA) 是转录长度大于 200 个核苷酸的非编码 RNA,能通过表观修饰、转录、转录后三个水平调控细胞生长、增殖、分化、凋亡等许多生物学过程。lncRNA 是近年来 PCOS 领域的研究热点,研究显示 PCOS 患者的外周血、卵巢颗粒细胞、卵泡液、子宫内膜中的 lncRNA 水平与正常女性存在显著差异,且与 PCOS 排卵障碍、高雄激素血症、胰岛素抵抗、子宫内膜容受性等密切相关,提示 lncRNA 是 PCOS 发病机制的重要部分,可能成为 PCOS 诊断的分子标志物。本文就 lncRNA 在 PCOS 中的作用及其分子机制进行综述。

【关键词】 多囊卵巢综合征; 长链非编码 RNA; 排卵障碍; 高雄激素血症; 胰岛素抵抗

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Roles and molecular mechanisms of long non-coding RNA in polycystic ovary syndrome

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【Abstract】 Polycystic ovary syndrome (PCOS) is a common reproductive endocrinopathy and metabolic disorder affecting 5%~20% of reproductive aged women and is the leading cause of anovulatory infertility. PCOS is highly complex and heterogeneous and the pathogenetic mechanism of it is yet unclear. Long non-coding RNA (lncRNA) are transcripts of more than 200 nucleotides which lack defined protein coding potential. lncRNA regulate cell growth, proliferation, differentiation, apoptosis in epigenetics, transcription and post-transcription levels. Recent studies indicated that lncRNA are dysregulated in blood, ovary granulosa cells, follicle fluid and uterine endometrium of PCOS patients. lncRNA are involved in anovulation, hyperandrogenism, insulin resistance and endometrial receptivity in PCOS and play pivotal roles in elucidating the pathogenesis of PCOS and providing potential biomarkers. In this review, we focused on roles and molecular mechanisms of lncRNA in PCOS.

【Key words】 Polycystic ovary syndrome; Long non-coding RNA; Anovulation; Hyperandrogenism; Insulin resistance

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·综述·

胚胎培养液和囊胚腔液中基因组 DNA 在胚胎植入前遗传学检测中的研究进展

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【摘要】 胚胎染色体异常是导致妊娠失败的主要原因之一，行胚胎植入前遗传学检测（preimplantation genetic testing, PGT），选择整倍体胚胎移植，可显著提高胚胎种植率和持续妊娠率。但由于 PGT 技术对胚胎的侵入性和技术的复杂性，限制了其在临床的广泛应用，开发一种安全、快速、经济的胚胎基因组检测方法将是生殖领域的一大进步。近年来，随着游离基因组 DNA 在胚胎培养液和囊胚腔液中的发现，许多学者开始探讨胚胎游离 DNA 在 PGT 中的适用性，然而目前的研究结果缺乏一致性结论。本文总结了胚胎培养液和囊胚腔液中基因组 DNA 在 PGT 领域的研究进展，并讨论其当前的局限性以及应用前景。

【关键词】 游离核酸； 胚胎植入前遗传学检测； 胚胎培养液； 囊胚腔液

Research progress of genomic DNA in spent embryo culture media and the blastocoel fluid in preimplantation genetic testing

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【Abstract】 Chromosomal abnormality of embryos is one of the main causes of pregnancy failure. Preimplantation genetic testing (PGT) can significantly improve the implantation rate and the rate of continuous pregnancy by selecting chromosomally normal embryos to transfer, but the invasive nature and operational complexity of PGT limit its clinical application. Therefore, the development of a non-invasive, rapid and economical method for embryo genome detection would represent a progress in assisted reproduction. In recent years, with the discovery of cell-free genomic DNA in spent embryo culture media and the blastocoel fluid, genetic analysis of cell-free DNA has been reported in evaluating the genetic constitution of embryos, however, the published studies lack consistent conclusions. In this review, we have summarized the progress of cell-free genomic DNA in PGT and discussed its current limitations and future clinical implications.

【Key words】 Cell-free nucleic acids; Preimplantation genetic testing; Spent embryo culture media; Blastocoel fluid

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·综述·

探讨 PLK1 在卵母细胞减数分裂中的调控机制 及其与有丝分裂的异同

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【摘要】 Polo 样激酶 1 (Polo-like kinase 1, PLK1) 是丝氨酸/苏氨酸蛋白激酶家族成员之一。在有丝分裂中, PLK1 参与控制中心体成熟、染色体凝聚、动粒-微管附着和胞质分裂。在哺乳动物卵母细胞减数分裂中 PLK1 也具有与在有丝分裂中类似的功能, 但尚缺少 PLK1 在卵母细胞减数分裂调节机制方面的系统性的文献综述报道。本文从 PLK1 在卵母细胞减数分裂各时期的定位情况, 及其在卵母细胞染色体凝聚、微管组织中心解聚、 γ -微管蛋白和中心粒周蛋白的募集以及后期促进复合物/细胞周期体 (anaphase-promoting complex/cyclostome, APC/C) 的活化中的作用, 这几个方面较为系统地探讨 PLK1 在卵母细胞减数分裂中的分子机制, 及其在有丝分裂与减数分裂之间的异同, 为进一步解析卵母细胞减数分裂的分子机制提供理论基础。

【关键词】 PLK1; 卵母细胞; 减数分裂; 微管组织中心; 纺锤体形成

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Research on the regulatory mechanism of PLK1 in oocyte meiosis and its similarities and differences between meiosis and mitosis

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【Abstract】 Polo-like kinase 1 (PLK1) is one of the members of the serine/threonine protein kinase family. In mitosis, PLK1 is involved in regulating centrosome maturation, chromosome condensation, kinetochore-microtubule attachment, and cytokinesis. It has been pointed out in some researches that PLK1 also has similar functions in meiosis in mammalian oocytes, but there is no systematic review on the role of PLK1 in the mechanism of meiosis regulation in oocytes. In this study, the regulating mechanism of PLK1 in oocyte meiosis and the similarities and differences between meiosis and mitosis were investigated systematically by the location of PLK1 in oocyte, and the role of PLK1 in chromosome condensation, microtubule organizing centers (MTOCs) depolymerization, the recruitment of γ -tubulin and Pericentrin, and activation of anaphase-promoting complex/cyclosome (APC/C). It will lay the foundations for the further research on the molecular mechanism of meiosis in oocytes.

【Key words】 PLK1; Oocyte; Meiosis; Microtubule organizing center; Spindle formation

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·综述·

子宫内膜异位症啮齿类动物模型建立的新进展

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【摘要】 子宫内膜异位症是一种最常见的影响育龄女性健康的慢性疾病，至今其病因与发病机制仍不清楚，构建适宜的动物模型有利于推进相关基础研究。目前啮齿类动物是较为经济，易于饲养，且子宫内膜结构与人类相似的实验对象。本文旨在分析比较近四年来啮齿类动物子宫内膜自体移植模型、同种异体移植模型以及异种移植模型等的构建方法、影响造模成功率的因素及其优缺点，并介绍了荧光定位模型、疼痛模型、深部型子宫内膜异位症模型等进展，为研究者进行关于发病机制和治疗的体内研究时选择适宜的动物模型提供参考。

【关键词】 子宫内膜异位症； 实验动物模型； 啮齿目

Update on development of rodent models for endometriosis

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【Abstract】 Endometriosis is one of the most common chronic diseases affecting the health of women of reproductive age, etiology and pathogenesis of which are still unclear. Therefore, the establishment of an appropriate animal model is imperative to the promotion of relevant basic research. Rodents are relatively economical, easy to feed, and have similar endometrial structure to humans. The objective of this paper is to compare the advantages and disadvantages among different autologous, homologous and xenotransplanted rodent models on experimental endometriosis in recent four years and factors influencing the success rate of modeling. The utility of models on fluorescent localization models, deep endometriosis and pain-related studies is also elaborated, so as to facilitate the selection of animal models for subsequent *in vivo* studies on pathogenesis and therapeutic strategies in endometriosis.

【Key words】 Endometriosis; Experimental animal models; Rodentia