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目 次

述 评

卵巢低反应诊疗的再思考·····李蓉 杨蕊 刘嘉茵 695

卵巢低反应专栏

卵巢低反应患者行体外受精后
累积活产率的影响因素·····徐蓓 朱桂金 岳静等 699
波塞冬分类标准下患者体外受精 / 卵胞质内单精子注射
妊娠结局的影响因素·····王含必 汤鲜 邓成艳等 706
口服避孕药在卵巢低反应患者控制性超促排卵
前期处理中的临床作用·····李昕 尚鸪 徐阳等 712
卵泡液中超氧化物歧化酶水平对卵巢低反应患者体外受精 /
卵胞质内单精子显微注射 - 胚胎移植
结局的影响·····吕翠婷 甄秀丽 白小双等 716

临床研究

多囊卵巢综合征患者应用卵泡期长效方案的
体外受精结局·····孔慧娟 陈彩虹 胡琳莉等 719
两种内膜准备方法对多囊卵巢综合征患者
妊娠结局的影响·····李艳梅 张莉莉 马晓玲等 725
重组人生长激素在前次早卵泡期长效方案体外受精
失败患者中的应用·····田莉峰 高敏 苏琼等 730

实验研究

人卵巢组织片段化处理调控 Hippo 信号通路联合 AKT 刺激物
对卵泡体外激活的作用研究·····丁海遐 吴霜 李文 735

循证医学

宫腔灌注粒细胞集落刺激因子对改善不孕症患者子宫内膜厚度
及临床妊娠结局疗效的 Meta 分析·····冯丽珍 张静 刘岩等 741

临床报道

辅助生殖门诊中 23 317 例不孕女性的病因分析·····许华 李亚东 伏静等 750
核磁共振联合超声成像在性发育异常
诊断中的应用研究·····王斯嘉 方兰兰 于医萍等 756

综 述

奥司他治疗肥胖型多囊卵巢综合征的研究进展·····蒋琪 贺婷婷 石玉华 763
未成熟卵体外培养与印记基因甲基化研究进展·····方露燕 程静 768
哺乳动物睾丸精子发生中 Wnt 信号通路的研究进展·····曾鹏 杨力 郭泽云 772
实时荧光定量聚合酶链式反应技术
在 B 族链球菌检测中的应用研究进展·····王雪梅 袁瑶 施长根 777

《中华生殖与避孕杂志》第一届通讯编委名单····· 734

《中华生殖与避孕杂志》稿约····· 封三

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CONTENTS IN BRIEF

Editorial

- A reconsideration of diagnosis and treatment of poor ovarian response..... 695
Li Rong, Yang Rui, Liu Jiayin

Poor Ovarian Response Column

- Influencing factors of cumulative live birth rate in patients with poor ovarian response undergoing *in vitro* fertilization 699
Xu Bei, Zhu Guijin, Yue Jing, et al
- Influential factors on the pregnancy outcome of *in vitro* fertilization/ intracytoplasmic sperm injection and embryo transfer in patients classified by Poseidon criteria 706
Wang Hanbi, Tang Xian, Deng Chengyan, et al
- Effect of oral contraceptive pill pretreatment on the patients with poor ovarian response prior to controlled ovarian hyperstimulation..... 712
Li Xin, Shang Jing, Xu Yang, et al
- Effect of the superoxide dismutase level in follicular fluid on *in vitro* fertilization/ intracytoplasmic sperm injection-embryo transfer outcome in patients with poor ovarian response 716
Lyu Cuiting, Zhen Xiuli, Bai Xiaoshuang, et al

Clinical Study

- Efficacy of follicular phase long-acting gonadotropin-releasing hormone agonist down-regulated long protocol for infertility treatment in polycystic ovary syndrome patients 719
Kong Huijuan, Chen Caihong, Hu Linli, et al
- Effects of two endometrial preparation schemes on the pregnancy outcome of patients with polycystic ovary syndrome 725
Li Yanmei, Zhang Lili, Ma Xiaoling, et al
- Application of recombinant human growth hormone in patients with previous *in vitro* fertilization failure 730
Tian Lifeng, Gao Min, Su Qiong, et al

Laboratory Study

- Regulation of Hippo signaling pathway by human ovarian tissue fragmentation combined with AKT stimulator on follicle activation *in vitro* 735
Ding Haixia, Wu Shuang, Li Wen

Evidence-based Medicine

- Effect of intrauterine perfusion of granulocyte colony stimulating factor on improving endometrial thickness in infertile women: a system review and Meta analysis 741
Feng Lizhen, Zhang Jing, Liu Yan, et al

Clinical Report

- Etiology analysis of 23 317 infertile women in assisted reproduction clinic 750
Xu Hua, Li Yadong, Fu Jing, et al
- Application of magnetic resonance imaging and ultrasound in diagnosis of disorder of sexual development 756
Wang Sijia, Fang Lanlan, Yu Yiping, et al

Review

- Research progress of orlistat on metabolic and ovulatory disorders in obese polycystic ovary syndrome patients 763
Jiang Qi, He Tingting, Shi Yuhua
- Advances in imprinted DNA methylation of *in vitro* culture of immature oocytes ... 768
Fang Luyan, Cheng Jing
- Roles of Wnt signaling pathway in mammalian testicular spermatogenesis ... 772
Zeng Peng, Yang Li, Guo Zeyun
- Application of real-time fluorescence quantitative polymerase chain reaction in detection of group B streptococcus..... 777
Wang Xuemei, Yuan Yao, Shi Changgen

卵巢低反应诊疗的再思考

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【摘要】 卵巢低反应 (poor ovarian response, POR) 是辅助生殖技术中卵巢对促性腺激素反应不良。2011 年制定了 POR 诊断的博洛尼亚标准, 方便用于临床结局的预测和咨询; 2016 年波塞冬组织提出了新的 POR 分类和标准, 概念上从 POR 变为“低预后”。高龄为 POR 的主要病因。对于 POR, 各种诊断标准逐步统一, 并且逐步考虑到临床应用的实用性, 临床治疗方案倾向于个体化, 但还需要大量临床数据和研究明确 POR 诊断方法的实用性, 以及对治疗的指导作用。

【关键词】 卵巢低反应; 诊断; 治疗; 现状调查

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A reconsideration of diagnosis and treatment of poor ovarian response

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【Abstract】 Poor ovarian response (POR) is hyporesponsiveness of ovaries to gonadotropin in assisted reproductive technology. In 2011, Bologna criteria for POR diagnosis consensus were established to facilitate the prediction and consultation of clinical outcomes. In 2016, POSEIDON Group put forward a new classification and criteria for ovarian hyporesponsiveness, conceptually changing from “low response” to “low prognosis”. Older age is the main cause of POR. For POR/hyporesponsiveness, various diagnostic criteria are gradually unified, and clinical treatment tends to be individualized. More clinical data and studies are needed to clarify the practicability of diagnostic methods for ovarian hyporesponsiveness and to guide the treatment.

【Key words】 Poor ovarian response; Diagnosis; Treatment; Current situation investigation

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卵巢低反应患者行体外受精后累积活产率的影响因素

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【摘要】目的 探讨卵巢低反应 (POR) 人群行多周期体外受精 (IVF) 的累积活产率及其影响因素。**方法** 回顾性分析 2002 年至 2016 年期间华中科技大学同济医学院附属同济医院生殖医学中心行 IVF- 胚胎移植 (ET)、并符合博洛尼亚标准的 3391 例 POR 患者临床资料, 计算其单周期累积活产率和多周期累积活产率, 采用 Kaplan-Meier(KM) 曲线评估乐观累积活产率和保守累积活产率, 并通过 logistic 多元回归分析累积活产率的影响因素。**结果** 经过 6 个 IVF 周期后 POR 人群的保守累积活产率为 14.9%, 乐观累积活产率为 35.3%。随着该人群年龄的增长, 其累积活产率下降。当年龄 >43 岁时, 累积活产率急剧下降 (4.4%)。Logistic 多元回归分析去除窦卵泡数 (AFC)、基础卵泡刺激素 (FSH) 水平、IVF 次数和不同促排卵方案等混淆因素, 结果显示 >38 岁女性的累积活产率显著低于 <35 岁女性 ($P < 0.01$)。Logistic 多元回归分析排除年龄、AFC、基础 FSH 水平和 IVF 次数等混淆因素后, 结果表明与标准长方案相比, 拮抗剂方案及黄体期促排卵方案的单周期累积活产率增高 ($OR=1.47$, $95\% CI=1.13\sim 1.90$, $P=0.004$; $OR=1.42$, $95\% CI=1.01\sim 2.01$, $P=0.04$); 自然周期方案活产率较其他方案低, 差异有统计学意义 (P 均 < 0.05)。**结论** 对于 POR 人群, 其累积活产率根据年龄增长而下降。>38 岁女性的累积活产率显著低于 < 35 岁女性, 尤其是年龄 >43 岁患者的累积活产率急剧下降。自然周期方案对于 POR 人群无益处。

【关键词】 累积活产率; 受精, 体外; 胚胎移植; 卵巢低反应; 博洛尼亚标准

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Influencing factors of cumulative live birth rate in patients with poor ovarian response undergoing *in vitro* fertilization

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【Abstract】 Objective To investigate the cumulative live birth rate (CLBR) and its influencing factors of multiple cycles *in vitro* fertilization (IVF) in patients with poor ovarian response (POR). **Methods** From 2002 to 2016, a total of 3391 women with POR undergoing IVF-embryo transfer (ET) in Reproductive Medicine Center of Tongji Hospital, Tongji Medicine College, Huazhong University of Science and Technology were analyzed retrospectively. Live birth rates per initiated cycle and CLBR for multiple IVF cycles were calculated. The conservative CLBR and optimistic CLBR were measured by Kaplan-Meier (KM) curve. The influencing factors of CLBR were analyzed by logistic multiple regression. **Results** The CLBR after 6 IVF cycles were 14.9% for the conservative estimate and 35.3% for the optimistic estimate. CLBR declined with increasing age. At age > 43 years, CLBR decreased sharply (4.4%). After adjusting for antral follicle count (AFC), basal follicle stimulating hormone (FSH) level, IVF cycle number and ovarian stimulation protocols, the CLBR of > 38 years old women was significantly lower than that of < 35 years old women ($P < 0.01$). After adjusting for age, AFC, basal FSH level, and IVF cycle number, compared with the standard long regimen, the single cycle CLBR of antagonist regimen and luteal stimulating regimen were higher ($OR = 1.47$, 95% $CI = 1.13 - 1.90$, $P = 0.004$; $OR = 1.42$, 95% $CI = 1.01 - 2.01$, $P = 0.04$); natural cycles were associated with the lowest CLBR among all the protocols, and this difference was significant compared with the other protocols (all $P < 0.05$). **Conclusion** For women with POR, the CLBR declined with increasing age. Women with advanced age (> 38 years) achieved a significantly lower CLBR than that in young POR women (< 35 years). Very low CLBR was associated with women aged > 43 years. Natural cycle IVF is of no benefit for these patients.

【Key words】 Cumulative live birth rate; Fertilization *in vitro*; Embryo transfer; Poor ovarian response; Bologna criteria

Fund program: National Natural Sciences Foundation of China (81571439); National Key Research and Development Program (2016YFC1000206-5)

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波塞冬分类标准下患者体外受精 / 卵胞质内单精子注射妊娠结局的影响因素

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【摘要】目的 探讨按波塞冬分类标准对接受体外受精 / 卵胞质内单精子注射 - 胚胎移植 (IVF/ICSI-ET) 人群妊娠结局的影响因素。**方法** 回顾性分析自 2015 年 6 月至 2017 年 6 月期间在北京协和医院接受 IVF/ICSI-ET 治疗共 1058 例患者资料。根据月经周期第 2 日的情况决定促排卵方案, 将其结果按波塞冬分类标准分为 4 类, 探讨与临床妊娠结局相关的影响因素。**结果** 按波塞冬分类标准分为 4 类患者, 年龄 <35 岁及窦卵泡数 (AFC) ≥ 5 组 ($n=467$), 获卵数、活产率、临床妊娠率分别为 (8.22 ± 3.63) 个、42.0%、55.0%; 年龄 ≥ 35 岁及 AFC ≥ 5 组 ($n=401$), 获卵数、活产率、临床妊娠率分别为 (6.28 ± 3.19) 个、22.4%、30.7%; 年龄 <35 岁及 AFC <5 组 ($n=20$), 获卵数、活产率、临床妊娠率分别为 (3.05 ± 1.50) 个、35.0%、45.0%; 年龄 ≥ 35 岁及 AFC <5 组 ($n=44$), 获卵数、活产率、临床妊娠率分别为 (3.20 ± 1.79) 个、15.9%、20.5%。各组间获卵数、活产率和临床妊娠率的比较差异均具有统计学意义 (P 均 <0.001)。对年龄 <35 岁及 AFC ≥ 5 组患者影响妊娠结局的单因素及多因素分析显示, 拮抗剂方案比双降调节方案分别为 $OR=0.522$, 95% $CI=0.305-0.894$, $P=0.018$; $OR=0.568$, 95% $CI=0.329-0.983$, $P=0.043$ 。年龄 ≥ 35 岁及 AFC ≥ 5 组对影响妊娠结局的单因素及多因素结果显示, 长效激动剂改良方案比双降调节方案 $OR=0.385$, 95% $CI=0.163-0.907$, $P=0.029$; $OR=0.396$, 95% $CI=0.167-0.938$, $P=0.035$; 拮抗剂方案比双降调节方案分析结果分别为 $OR=0.217$, 95% $CI=0.087-0.544$, $P=0.001$; $OR=0.229$, 95% $CI=0.091-0.576$, $P=0.002$ 。**结论** 年龄是影响妊娠结局的重要因素, 双降调节方案比长效激动剂改良方案及拮抗剂方案似乎有更好的妊娠结局, 仍需大样本前瞻性研究给予更科学的证据。

【关键词】 受精, 体外; 胚胎移植; 卵巢低反应; 博洛尼亚标准; 波塞冬标准

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Influential factors on the pregnancy outcome of *in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer in patients classified by Poseidon criteria

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【Abstract】 Objective To investigate the influential factors on the pregnancy outcome of *in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer (IVF/ICSI-ET) in patients classified by Poseidon criteria. **Methods** The 1058 patients who underwent IVF/ICSI-ET in Peking Union Medical Hospital from June 2015 to June 2017 were collected. Ovulation induction protocol was decided according to the age, sex hormone levels and antral follicle count (AFC). Four groups for the patients had been defined by the Poseidon criteria. These cases were analyzed retrospectively to study the relative factors of the pregnancy outcome of IVF/ICSI-ET. **Results** The patients were divided into four groups according to the Poseidon criteria, age < 35 years and AFC ≥ 5 group ($n=467$), the data revealed that No. of oocytes retrieved, live birth rate and clinical pregnancy rate were 8.22 ± 3.63 , 42.0%, 55.0%, respectively; age ≥ 35 years and AFC ≥ 5 group ($n=401$), the data revealed that No. of oocytes retrieved, live birth rate and clinical pregnancy rate were 6.28 ± 3.19 , 22.4%, 30.7%, respectively; age < 35 years and AFC < 5 group ($n=20$), the data revealed that No. of oocytes retrieved, live birth rate and clinical pregnancy rate were 3.05 ± 1.5 , 35.0%, 45.0%, respectively; age ≥ 35 years and AFC < 5 group ($n=44$), the data revealed that No. of oocytes retrieved, live birth rate and clinical pregnancy rate were 3.20 ± 1.79 , 15.9%, 20.5%, respectively. Comparison of retrieved oocytes, live birth rate and clinical pregnancy rate among the groups showed a statistically significant difference (all $P < 0.001$). The univariate and multivariate analysis of factors influencing pregnancy outcome in age < 35 years and AFC ≥ 5 group showed that antagonist program vs. dual down-regulation: OR=0.522, 95% CI=0.305–0.894, $P=0.018$; OR=0.568, 95% CI=0.329–0.983, $P=0.043$, respectively. The univariate and multivariate analysis of factors influencing pregnancy outcome in age ≥ 35 years and AFC ≥ 5 group showed that long-acting-agonists modified program vs. dual down-regulation program was OR=0.385, 95% CI=0.163–0.907, $P=0.029$; OR=0.396, 95% CI=0.167–0.938, $P=0.035$; antagonist program vs. dual down-regulation program was OR=0.217, 95% CI=0.087–0.544, $P=0.001$; OR=0.229, 95% CI=0.091–0.576, $P=0.002$, respectively. **Conclusion** Age is an important factor to affect the gravida and newborn outcome. The pregnancy outcome of the double down-regulation protocol was better than the improved gonadotropin-releasing hormone agonist (GnRH-a) downregulation and antagonist protocols. Further research is required to investigate this in larger and longer-term studies.

【Key words】 Fertilization *in vitro*; Embryo transfer; Poor ovarian response; Bologna criteria; Poseidon criteria

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口服避孕药在卵巢低反应患者控制性超促排卵 前期处理中的临床作用

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【摘要】目的 探讨卵巢低反应 (POR) 患者在接受促性腺激素释放激素拮抗剂 (GnRH-A) 方案控制性超促排卵 (COH) 前一周期使用口服避孕药 (OCP) 预处理的临床价值。**方法** 将 2013 年 1 月至 2017 年 12 月期间在北京大学第一医院妇产科接受体外受精 / 卵胞质内单精子显微注射 - 胚胎移植 (IVF/ICSI-ET) 的 POR 患者 559 例按照 COH 前是否接受 OCP 治疗分为 OCP 组 ($n=161$) 和对照组 ($n=398$), 对入选患者的病历资料进行回顾分析。**结果** OCP 组患者促性腺激素使用总量 [(31.19 ± 17.03) 支] 及使用时间 [(8.64 ± 2.92) d] 较对照组减少 [(38.96 ± 13.92) 支, $P < 0.001$; (9.38 ± 2.26) d, $P = 0.004$], 周期取消率 (14.91%) 较对照组降低 (25.13%, $P = 0.008$), 且获卵数 (3.74 ± 1.31)、M_{II} 卵子数 (3.00 ± 1.12)、活产率 (26.28%) 较对照组升高 (3.44 ± 1.36 , $P = 0.030$; 2.74 ± 1.26 , $P = 0.030$; 17.45%, $P = 0.033$), 差异均有统计学意义。**结论** POR 患者接受 GnRH-A 前 OCP 预处理可降低周期取消率, 改善临床结局。

【关键词】 受精, 体外; 卵胞质内单精子注射; 卵巢低反应; 口服避孕药

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Effect of oral contraceptive pill pretreatment on the patients with poor ovarian response prior to controlled ovarian hyperstimulation

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【Abstract】 Objective To determine whether the use of oral contraceptive pill (OCP) pretreatment prior to gonadotropin-releasing hormone antagonist (GnRH-A) protocol would improve the outcome of poor ovarian responders. **Methods** Totally 559 poor ovarian responders undergoing *in vitro* fertilization/intracytoplasmic sperm injection-embryo transfer (IVF/ICSI-ET) cycles in Department of Obstetrics and Gynecology, Peking University First Hospital from January 2013 to December 2017 were divided into two groups according to the history whether the patients had been treated with OCP before the ovulatory period (OCP group, $n=161$; control group, $n=398$). Clinical data of these 559 patients were retrospectively analyzed. **Results** The required ampoules (31.19 ± 17.03) and the duration of gonadotropin [(8.64 ± 2.92) d] were lower in patients pretreatment with OCP than that in patients of control group [38.96 ± 13.92 , $P < 0.001$; (9.38 ± 2.26) d, $P = 0.004$]. The cycle cancelled rate in patients of the OCP group (14.91%) was also lower than in patients of control group (25.13%, $P = 0.008$). The number of oocyte retrieval (3.74 ± 1.31), the number of M_{II} oocyte (3.00 ± 1.12) and the live birth rate (26.28%) were significantly higher in patients pretreatment with OCP than in patients of control group (3.44 ± 1.36 , $P = 0.030$; 2.74 ± 1.26 , $P = 0.030$; 17.45%, $P = 0.033$). All the differences were statistically significances. **Conclusion** OCP administered before IVF-ET/ICSI were shown to improve the effect of ovulation-promotive treatment and decrease the cycle cancelled rate in poor ovarian responders.

【Key words】 Fertilization *in vitro*; Intracytoplasmic sperm injection; Poor ovarian response; Oral contraceptive pill

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卵泡液中超氧化物歧化酶水平对卵巢低反应患者体外受精 / 卵泡质内单精子显微注射 - 胚胎移植结局的影响

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【摘要】目的 探讨卵巢低反应 (POR) 患者取卵日卵泡液中超氧化物歧化酶 (SOD) 水平对其体外受精 / 卵泡质内单精子显微注射 - 胚胎移植 (IVF/ICSI-ET) 结局的影响。**方法** 回顾性分析 2016 年 12 月至 2017 年 10 月期间河北医科大学第四医院生殖医学科行 IVF/ICSI-ET 助孕的 108 例 POR 患者的资料。其中 78 例患者行 ET, 分为未妊娠组 ($n=49$) 和妊娠组 ($n=29$)。电化学发光法检测患者血清中基础黄体生成素 (LH) 及基础卵泡刺激素 (FSH) 水平, 生化分析仪检测患者卵泡液中 SOD 水平。**结果** 取卵日患者卵泡液中 SOD 水平在未妊娠者 [5.36 ± 1.94] IU/mL 较受孕者 [6.98 ± 1.70] IU/mL 显著降低 ($P < 0.001$), 与年龄、体质量指数 (BMI) 呈明显负相关 ($P < 0.001$, $P = 0.009$), 与 M_{II} 卵率、正常受精率、可利用胚胎率、优质胚胎率呈明显正相关 ($P = 0.001$, $P < 0.001$, $P = 0.001$, $P < 0.001$)。**结论** POR 患者卵泡液中存在氧化应激状态, 可能影响卵子质量, 从而影响 IVF-ET 结局。

【关键词】 受精, 体外; 胚胎移植; 超氧化物歧化酶; 氧化性应激; 卵巢低反应; 临床结局

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· 卵巢低反应 ·

Effect of the superoxide dismutase level in follicular fluid on *in vitro* fertilization/intracytoplasmic sperm injection-embryo transfer outcome in patients with poor ovarian response

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【Abstract】 Objective To investigate the effect of the superoxide dismutase (SOD) level in follicular fluid on the *in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer (IVF/ICSI-ET) outcome in patients with poor ovarian response (POR). **Methods** The data of 108 patients with poor ovarian response who were treated with IVF-ET in our center in the Fourth Hospital of Hebei University from December 2016 to October 2017 were analyzed retrospectively. Totally 78 patients accepted embryo transfer were divided into two groups according to pregnancy or not (29 cases were pregnant and 49 cases were not). The levels of luteinizing hormone (LH), follicle-stimulating hormone (FSH) in serum were detected by electrochemiluminescence method, and the level of SOD in follicular fluid was detected by biochemical analyzer. **Results** The level of SOD in the follicular fluid was decreased in non-pregnant women compared with pregnant women [(5.36 ± 1.94) IU/mL, (6.98 ± 1.70) IU/mL] ($P < 0.001$), and was significantly negatively correlated with age and body mass index (BMI) ($P < 0.001$, $P = 0.009$), and positively related to the rate of mature oocyte rate, two pronuclear (2PN) fertilization rate, available embryo rate and excellent embryo rate ($P < 0.001$, $P = 0.001$, $P < 0.001$). **Conclusion** There were really oxidative stress in the follicular fluid of POR patients, which may affect the quality of oocyte and the outcome of IVF-ET.

【Key words】 Fertilization *in vitro*; Embryo transfer; Superoxide dismutase; Oxidative stress; Poor ovarian response; Clinical outcome

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多囊卵巢综合征患者应用卵泡期长效方案的体外受精结局

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【摘要】目的 探讨不同方案对多囊卵巢综合征(PCOS)患者进行体外受精/单精子卵胞质内显微注射(IVF/ICSI)结局的影响。方法 回顾性分析2015年1月至2016年12月在郑州大学第一附属医院生殖中心进行第一周期IVF/ICSI助孕的PCOS患者的临床资料。采用卵泡期长效降调节方案的851例患者作为研究组;采用黄体期短效降调节方案的632例患者作为对照组,比较两组的妊娠结局情况。结果 患者在平均年龄、不同体质量指数(BMI)分布、因卵巢过度刺激综合征(OHSS)倾向取消周期以及移植胚胎数组间差异均无统计学意义($P>0.05$)。研究组较对照组促性腺激素(Gn)使用剂量多、Gn使用时间长、人绒毛膜促性腺激素(hCG)注射日内膜厚度厚和获卵数少、可移植胚胎数少,差异均有统计学意义(均 $P<0.0001$)。研究组在取卵周期的临床妊娠率(76.17%)和活产率[34.43%(95% CI=31.24%~37.62%)]高于对照组[59.26%, $P<0.0001$; 24.68%(95% CI=21.32%~28.05%), $P<0.0001$]。所有冻融胚胎移植后2种方案的累积活产率差异无统计学意义[69.21%(95% CI=66.11%~72.31%)比67.88%(95% CI=64.24%~71.52%), $P=0.5843$]。BMI ≥ 25.00 kg/m²患者的累积活产率研究组略高于对照组,差异无统计学意义($P=0.1265$)。结论 与黄体期短效方案相比,不同BMI的PCOS患者应用卵泡期长效方案活产率均显著升高,累积活产率无明显差异。

【关键词】多囊卵巢综合征; 受精, 体外; 促性腺激素释放激素激动剂; 累积活产率

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Efficacy of follicular phase long-acting gonadotropin-releasing hormone agonist down-regulated long protocol for infertility treatment in polycystic ovary syndrome patients

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【Abstract】 Objective To evaluate the effect of different methods on *in vitro* fertilization/intracytoplasmic sperm injection (IVF/ICSI) outcomes in patients with polycystic ovary syndrome (PCOS). **Methods** This retrospective study examined the outcomes of IVF/ICSI with different down-regulated long protocols in PCOS. All first IVF/ICSI treatment cycles between January 2015 and December 2016 in Reproduction and Genetics Hospital of the First Affiliated Hospital of Zhengzhou University were analyzed. Patients were recruited, who were treated with follicular phase long-acting gonadotropin-releasing hormone agonist (GnRH-a) down-regulated long protocol as study group ($n=851$) and luteal phase short-acting Triptorelin down-regulated long protocol as control group ($n=632$). The pregnancy outcomes were analyzed. **Results** The basal line in age, body mass index (BMI), cycle cancellation rate of ovarian hyperstimulation syndrome (OHSS), average number of transplanted embryos were comparable in the two groups. Total dosage and duration of gonadotropin (Gn) used, endometrial thickness and estradiol level on the human chorionic gonadotropin (hCG) trigger day in study group were higher than those in control group, while the number of the oocyte retrieval and transplantable embryos was lower than that in control group, the differences were statistically significant ($P<0.01$). In study group, the clinical pregnancy rate (76.17%) and the live birth rate [34.43% (95% $CI=31.24\%-37.62\%$)] were higher than those in control group [59.26%, $P<0.01$; 24.68% (95% $CI=21.32\%-28.05\%$), $P<0.01$]. But the total cumulative live birth rate was comparable in the two groups [69.21% (95% $CI=66.11\%-72.31\%$) vs. 67.88% (95% $CI=64.24\%-71.52\%$), $P=0.584$]. When the results were stratified in BMI, the cumulative live birth rate got better outcome in BMI ≥ 25.00 kg/m² subgroup without statistically significant ($P=0.126$). **Conclusion** PCOS patients can get better live birth rate and similiar cumulative live birth rate after follicular phase long-acting GnRH-a down-regulated long protocol.

【Key words】 Polycystic ovary syndrome; Fertilization *in vitro*; Gonadotropin-releasing hormone agonist; Cumulative live birth rate

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两种内膜准备方法对多囊卵巢综合征患者妊娠结局的影响

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【摘要】目的 探讨冻融胚胎移植术 (FET) 中采用不同方法准备内膜对多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 患者妊娠结局的影响。**方法** 回顾性分析 2016 年 1 月至 2017 年 12 月期间于兰州大学第一医院生殖医学专科医院行 FET 术获临床妊娠的 205 例 PCOS 患者的资料。根据不同的内膜准备方法进行分组, 其中常规激素替代组 70 例, 促性腺激素释放激素激动剂 (GnRH-a) 降调节后激素替代组 135 例。分析比较两组患者的妊娠丢失率 (早期流产率 + 晚期流产率 + 异位妊娠率)、早产率、活产率、低出生体重儿率及妊娠并发症的情况。**结果** 常规激素替代组的妊娠丢失率 [25.7%(18/70)] 高于 GnRH-a 降调节后激素替代组 [13.3%(18/135)]($P=0.027$), 其中前者的早期流产率 [21.4%(15/70)] 高于后者 [8.1%(11/135)], 差异有统计学意义 ($P=0.007$); 常规激素替代组的活产率 [74.3%(52/70)] 低于 GnRH-a 降调节后激素替代组 [86.7%(117/135)], 差异有统计学意义 ($P=0.027$)。患者的平均年龄、体质指数 (BMI)、移植日子宫内膜厚度、移植胚胎数、胚胎种植率组间比较差异均无统计学意义 ($P>0.05$); 常规激素替代组的移植优质胚胎率 [34.2%(52/152)] 有高于降调节后激素替代组 [25.6%(80/312)] 的趋势, 但差异无统计学意义 ($P>0.05$)。患者晚期流产率、异位妊娠率、早产率、多胎率、妊娠并发症率组间比较差异均无统计学意义 ($P>0.05$), 每组各有 1 例新生儿死亡。**结论** 与常规激素替代法相比, 应用 GnRH-a 降调节后激素替代方法准备内膜的 PCOS 患者在临床妊娠后更有可能获得更好的妊娠结局。

【关键词】 胚胎移植; 多囊卵巢综合征; 妊娠; 胚胎丢失; 妊娠结局

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Effects of two endometrial preparation schemes on the pregnancy outcome of patients with polycystic ovary syndrome

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【Abstract】 Objective To compare the pregnancy outcomes of clinical pregnancy patients with polycystic ovary syndrome (PCOS) who underwent frozen-thawed embryo transfer (FET) using different methods to prepare endometrium. **Methods** The data of 205 clinical pregnancy patients with PCOS who were treated in Reproductive Medicine Special Hospital of the 1st Hospital of Lanzhou University during the period from January 2016 to December 2017 were retrospectively analyzed. The patients were grouped according to different methods of endometrial preparation, including routine hormone replacement group ($n=70$) and gonadotropin-releasing hormone agonist (GnRH-a) downregulation hormone replacement group ($n=135$). The rates of pregnancy loss (containing early miscarriage, late miscarriage and ectopic pregnancy), premature delivery, live birth, low birth weight infant and pregnancy complications were compared between the two groups. **Results** Pregnancy loss rate in routine hormone replacement group [25.7% (18/70)] was higher than that in GnRH-a downregulation hormone replacement group [13.3% (18/135)] ($P=0.027$). The early miscarriage rate of the former [21.4% (15/70)] was higher than that of the latter [8.1% (11/135)] ($P=0.007$). The live birth rate [74.3% (52/70)] in the routine hormone replacement group was lower than that in the GnRH-a downregulation group [86.7% (117/135)] ($P=0.027$). No significant differences were found between the two groups in mean age, body mass index (BMI), endometrial thickness on transplant day, number of transplanted embryos, and embryo implantation rate ($P>0.05$). The rate of good-quality embryo transplantation in routine hormone replacement group [34.2% (52/152)] was higher than that in downregulation hormone replacement group [25.6% (80/312)], but there was no significant difference ($P>0.05$). There were no significant differences in the rates of late miscarriage, ectopic pregnancy, premature delivery, multiple pregnancy, and pregnancy complication between the two groups ($P>0.05$). One neonatal death happened in each group. **Conclusion** It's more likely to achieve good pregnancy outcomes when patients with PCOS prepared endometrium with GnRH-a downregulation hormone replacement comparing with the routine hormone replacement.

【Key words】 Embryo transfer; Polycystic ovary syndrome; Pregnancy; Embryo loss; Pregnancy outcome

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重组人生长激素在前次早卵泡期长效长方案体外受精失败患者中的应用

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【摘要】目的 探讨在前次早卵泡期长效长方案体外受精 (IVF) 失败患者中添加重组人生长激素 (rhGH), 对患者胚胎质量及临床结局的影响。**方法** 选择 2017 年 4 月至 2018 年 4 月期间在江西省妇幼保健院生殖中心行 IVF- 胚胎移植 (ET) 助孕治疗、无可利用胚胎或胚胎质量差而助孕失败的 54 例患者为研究对象。患者 2 个周期均采用早卵泡期长效长方案进行, 第 2 周期添加 rhGH 预处理持续 4 周 (GH 组), 促排卵期间 rhGH 维持至人绒毛膜促性腺激素 (hCG) 注射日, 采用自身对照方法观察患者添加 rhGH 后胚胎质量及妊娠结局的改善。**结果** 患者前后 2 次促排卵治疗促性腺激素 (Gn) 使用时间、Gn 使用总量、hCG 注射日子宫内膜厚度、雌激素水平、获卵数、双原核 (2PN) 卵裂率、移植胚胎数比较差异均无统计学意义 ($P>0.05$)。GH 组中 hCG 注射日孕酮水平 $[(0.55\pm 0.29)\mu\text{g/L}]$ 、早期流产率 (7.69%)、因胚胎质量差取消周期率 (0%) 显著低于自身对照组 $[(0.80\pm 0.31)\mu\text{g/L}]$, $P<0.001$; 66.67%, $P=0.042$; 24.07%, $P<0.001$]; GH 组 2PN 受精率 (64.36%)、可利用胚胎率 (56.08%)、临床妊娠率 (50.98%)、种植率 (42.39%) 显著高于自身对照组 (53.90%, 31.75%, 7.50%, 4.84%), 差异均有统计学意义 (P 均 <0.001)。**结论** 对于接受早卵泡期长效长方案促排卵治疗但因胚胎质量不佳导致助孕失败的患者, 再次促排卵治疗中结合小剂量 rhGH 预处理, 可以显著提高胚胎质量, 从而改善妊娠结局。

【关键词】 生长激素; 临床妊娠率; 受精, 体外; 胚胎移植; 胚胎质量; 早卵泡期长效长方案

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Application of recombinant human growth hormone in patients with previous *in vitro* fertilization failure

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【Abstract】 Objective To investigate the effect of recombinant human growth hormone (rhGH) on embryo quality and clinical outcome of patients used an early follicular phase prolonged protocol with previous *in vitro* fertilization (IVF) failure. **Methods** From April 2017 to April 2018, 54 patients who had pregnancy failure due to no available embryo or poor quality of embryo in the previous cycle with early follicular phase prolonged protocol were selected for the study. Patients used an early follicular phase prolonged protocol both before and after in the two cycles. In the second cycle, rhGH pretreatment was added for 4 weeks (GH group), and rhGH was maintained until human chorionic gonadotropin (hCG) injection day during ovulation induction. The improvement of embryo quality and the pregnancy outcome after rhGH addition was observed by self-control method. **Results** There were no significant differences in the duration of gonadotropin (Gn) used, total dosage of Gn used, the endometrial thickness and estrogen levels on hCG injection day, the number of oocytes retrieved, two pronucleus (2PN) cleavage rate, embryo transfer number per cycle between the two groups ($P>0.05$). In GH group, the progesterone levels on hCG injection day [$(0.55 \pm 0.29) \mu\text{g/L}$], the early abortion rate (7.69%) and the cancellation cycle rate due to poor embryo quality (0%) were significantly lower than those in control group [$(0.80 \pm 0.31) \mu\text{g/L}$, $P<0.001$; 66.67%, $P=0.042$; 24.07%, $P<0.001$]. The 2PN fertilization rate (64.36%), the available embryo rate (56.08%), the clinical pregnancy rate (50.98%) and the implantation rate (42.39%) in GH group were significantly higher than those in control group (53.90%, 31.75%, 7.50%, 4.84%) (all $P<0.001$). **Conclusion** Low dose rhGH pretreatment can significantly improve embryo quality and pregnancy outcome in patients who had previous pregnancy failure due to poor embryo quality, and received an early follicular phase prolonged protocol in IVF cycles.

【Key words】 Growth hormone; Clinical pregnancy rate; Fertilization *in vitro*; Embryo transfer; Embryo quality; Early follicular phase prolonged protocol

Fund program: Foundation of Jiangxi Province Department of Science and Technology (20151BBG70100)

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人卵巢组织片段化处理调控 Hippo 信号通路联合 AKT 刺激物对卵泡体外激活的作用研究

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【摘要】目的 检测人卵巢片段化处理及蛋白激酶 B 刺激物体外对卵泡体外激活的作用。方法 人卵巢组织体外行片段化处理, 检测 Hippo 信号通路 YES 相关蛋白 (Yes associated protein, YAP)、磷酸化 YAP(p-YAP) 及细胞通讯网络 (cellular communication network, CCN) 生长因子、凋亡重复序列的柱状病毒抑制剂 (baculoviral inhibitors of apoptosis repeat containing, BIRC) 凋亡抑制因子水平, 明确片段化处理后对卵巢的影响。将片段化处理后的卵巢组织体外加入 AKT 刺激物培养后检测磷酸化 AKT(p-AKT) 表达水平, 并进行裸鼠背阔肌移植, 探究是否可激活卵泡发育。结果 片段化处理降低了人卵巢组织 p-YAP 表达, 增加了 CCN 生长因子及 BIRC 凋亡抑制因子的表达。运用 AKT 刺激物体外培养片段化处理后的卵巢组织 p-AKT 的表达水平增加, 裸鼠背阔肌移植 2 周后卵巢组织内可见始基卵泡及新生的血管。结论 人卵巢组织片段化处理可阻断 Hippo 信号通路; 联合 AKT 刺激物处理卵巢可以刺激卵泡发育。

【关键词】片段化处理; AKT 刺激物; 体外激活; 卵泡发育; 卵巢早衰

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Regulation of Hippo signaling pathway by human ovarian tissue fragmentation combined with AKT stimulator on follicle activation *in vitro*

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【Abstract】 Objective To investigate the effects of human ovarian fragmentation and AKT stimulation on follicular *in vitro* activation. **Methods** The Hippo signaling pathway related proteins Yes associated protein (YAP), p-YAP, cellular communication network (CCN) growth factor and baculoviral inhibitors of apoptosis repeat containing (BIRC) apoptosis inhibitors were detected by fragmenting human ovarian tissues *in vitro* to determine the effects of the fragmentation on ovaries. p-AKT expression was detected after adding AKT stimulator to the fragmented ovarian tissues *in vitro*, and latissimus dorsi muscle transplantation was performed in nude mice to explore whether follicular development could be activated. **Results** The fragmentation decreased the expression of p-YAP and increased the expression of CCN growth factor and BIRC apoptosis suppressor. The expression of p-AKT was increased in the fragmented ovarian tissue cultured with AKT stimulant *in vitro*. Two weeks after latissimus dorsi muscle transplantation in nude mice, there were primordial follicles and new blood vessels in the ovarian tissue. **Conclusion** Human ovarian tissue fragmentation can disrupt Hippo signaling pathway. Treatment with AKT stimulation of the ovary can stimulate follicular development.

【Key words】 Fragmentation; AKT stimulation; *In vitro* activation; Follicular development; Premature ovarian failure

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宫腔灌注粒细胞集落刺激因子对改善不孕症患者子宫内膜厚度及临床妊娠结局疗效的 Meta 分析

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【摘要】目的 对宫腔灌注粒细胞集落刺激因子(G-CSF)改善不孕症患者子宫内膜厚度及临床妊娠结局的有效性进行综合评价。方法 利用计算机检索 Pubmed、Embase、Cochrane Library、Medline 和维普(VIP)、中国生物医学文献数据库(CMB)万方数据库,中国知网(CNKI)各大数据库,检索文献发表日期截止至2018年6月,检索所有使用宫腔灌注G-CSF改善子宫内膜厚度及临床妊娠结局的相关文章,对纳入文献进行资料提取与质量评价后,使用 Revman5.3 进行 Meta 分析,并进一步进行敏感性分析,并对纳入文献进行偏倚风险评估。结果 本文共纳入 17 篇文献,不同研究中干预措施基本一致(宫腔灌注G-CSF)。宫腔灌注G-CSF组的子宫内膜厚度、内膜厚度变化值、临床妊娠率和胚胎种植率较对照组明显增加,差异有统计学意义($P<0.000\ 01$)。G-CSF组周期取消率较对照组明显降低,差异有统计学意义($RR=0.37, 95\% CI=0.28\sim0.48, P<0.000\ 01$)。纳入文献研究的发表偏倚程度并不大。结论 宫腔灌注G-CSF可明显改善子宫内膜厚度,提高临床妊娠率和胚胎种植率,减少周期取消率,但仍需大样本的随机对照试验验证,G-CSF改善子宫内膜厚度的机制仍有待进一步研究。

【关键词】 粒细胞集落刺激因子; 不孕症; 子宫内膜; Meta 分析; 宫腔灌注

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Effect of intrauterine perfusion of granulocyte colony stimulating factor on improving endometrial thickness in infertile women: a system review and Meta analysis

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【Abstract】 Objective To evaluate the effectiveness of uterine perfusion with granulocyte colony stimulating factor (G-CSF) in improving endometrial thickness and clinical pregnancy outcomes in infertile patients. **Methods** Pubmed, Embase, Cochrane Library, Medline and Wanfang database of Chinese biomedicine literature database and Chinese National Knowledge Infrastructure (CNKI) were searched by computer. All articles on the improvement of endometrial thickness and clinical pregnancy outcomes using uterine perfusion G-CSF were searched until June 2018 of publication date. After data extraction and quality evaluation, Revman5.3 was used for Meta analysis, and further sensitivity analysis and bias risk assessment was performed for inclusion literature. **Results** Seventeen articles were included in this study, and the intervention measures were basically the same in different studies (uterine perfusion with G-CSF). Thickness of endometrium, the changes of endometrial thickness, clinical pregnancy rate and embryo implantation rate in G-CSF group were significantly higher than those in control group ($P < 0.000\ 01$). The cycle elimination rate of G-CSF group was significantly lower than that of control group, and the difference was statistically significant ($RR=0.37$, $95\% CI=0.28-0.48$, $P < 0.000\ 01$). The publication bias of inclusion in literature research was not significant. **Conclusion** G-CSF increased endometrial thickness, clinical pregnancy rate and embryo implantation rate, reduced cycle cancellation rate. However, large sample of randomized controlled trials are still needed to verify the effectiveness and the mechanism of improving endometrial thickness by G-CSF remains to be further studied.

【Key words】 Granulocyte colony stimulating factor; Infertility; Endometrial thickness; Meta analysis; Intrauterine perfusion

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辅助生殖门诊中 23 317 例不孕女性的病因分析

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许华和李亚东对本文有同等贡献

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【摘要】目的 分析近年辅助生殖门诊不孕病例中的女性病因情况。方法 回顾性分析 2013 年至 2017 年期间复旦大学附属妇产科医院集爱遗传与不育诊疗中心门诊初诊不孕症患者临床资料, 分析女性因素以及双方共同因素不孕病例中的女性病因。结果 共纳入 23 317 例不孕症患者。不孕因素中女性因素、男性因素、双方共同因素以及不明原因的不孕症分别占总病例的 62.6%、9.2%、26.5% 和 1.7%。原发病例总数 12 405 例, 占总病例数的 53.2%。女性因素的原发不孕症病例占比 (51.7%) 低于继发不孕 (75.0%), 差异有统计学意义 ($P < 0.001$)。原发不孕中, 男性因素 (12.9%)、双方因素 (33.2%) 以及不明原因 (2.2%) 的原发不孕病例占比高于继发不孕 (5.2%、18.6% 和 1.2%, P 均 < 0.001)。女性相关不孕病例中, 输卵管因素不孕病例占 82.1%。其中, 72.7% 的原发不孕女性为输卵管因素, 占比低于继发不孕女性 (92.9%), 差异有统计学意义 ($P < 0.001$)。所有就诊的女性平均年龄为 31.9 岁, 其中卵巢储备功能下降和子宫因素病因的平均诊断年龄分别为 37.1 岁和 33.6 岁, 高于输卵管因素、子宫内膜因素、染色体因素、排卵功能障碍及其他因素的诊断年龄, 差异有统计学意义 (P 均 < 0.05)。73.6% 的就诊患者体质量指数处于正常范围。结论 2013 年至 2017 年就诊患者中, 女性的平均就诊年龄有上升趋势, 女性因素是主要的不孕症发病因素。女性相关不孕症中, 输卵管因素是主要的病因, 特别是在继发不孕病例中。

【关键词】女性不孕病因; 辅助生殖门诊; 输卵管因素

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Etiology analysis of 23 317 infertile women in assisted reproduction clinic

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【Abstract】 Objective To investigate female etiology of infertility in assisted reproductive clinic in recent years. **Methods** A retrospective analysis was conducted on the clinical data of 23 317 infertility patients diagnosed in assisted reproductive clinic of Shanghai Ji Ai Genetics and IVF Institute from 2013 to 2017. According to the current guidelines and standards, female etiology of infertility cases (including female factor and bilateral factor infertility) was integrated and analyzed. **Results** According to the analysis, female factor, male factor, bilateral factor and unexplained infertility accounted for 62.6%, 9.2%, 26.5% and 1.7% of the total cases respectively. The total number of primary cases was 12 405, accounting for 53.2% of the total number of cases. The proportion of primary infertility caused by female factors (51.7%) was lower than that of secondary infertility (75.0%), while the proportion of primary infertility caused by male factors (12.9%), bilateral factors (33.2%) and unknown causes (2.2%) were higher than those of secondary infertility (5.2%, 18.6% and 1.2%, respectively). In the case of female-related etiology, the factor of fallopian tube as the etiology accounted for 82.1%, which was the main pathogenic factor. The problem of tubal factors was found in 72.7% of the primary cases with female-related factors, which was lower than that of the secondary cases with female-related factors (92.9%). The average age of all female patients was 31.9 years old, higher than the age previously reported. Among women, the mean age of diagnosis of diminished ovarian reserve and uterine factor etiology was 37.1 years and 33.6 years, respectively, higher than that of other etiologies. The body mass index of most patients (73.6%) was in the normal range. **Conclusion** Among the patients visited from 2013 to 2017, the average age of female patients continue to increase and female factor is the main factor of infertility. Oviduct factor is the main cause of infertility associated with female factors and occurs in the vast majority of secondary cases.

【Key words】 Etiology of female infertility; Assisted reproduction clinics; Oviduct factor

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核磁共振联合超声成像在性发育异常诊断中的应用研究

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【摘要】 目的 探讨核磁共振成像 (MRI) 和超声在性发育异常诊断中的应用。方法 对 2007 年 4 月至 2018 年 9 月期间在郑州大学第一附属医院确诊为性发育异常的 43 例患者进行回顾性分析, 共纳入 17 例经腹腔镜下性腺探查术或切除术的性发育异常患者, 对比分析其 MRI、超声表现与手术病理结果。结果 17 例性发育异常患者术中可见性腺 30 个 (卵巢 16 个、睾丸 12 个、卵睾 2 个), MRI 可见性腺 22 个, 准确率为 76.4%; 超声可见性腺 16 个, 准确率为 58.9%; 2 种影像学方法结合可监测到性腺 24 个, 准确率为 82.3%; MRI 和超声检查结合诊断性腺准确率明显高于单一的超声检查方法, 差异具有统计学意义 ($P=0.031$), 略高于单一的 MRI 检查方法, 差异无统计学意义 ($P>0.05$)。17 例性发育异常患者术中可见子宫 12 例, MRI 可见 13 例, 过诊 1 例, 超声可见 11 例, 漏诊 1 例。MRI 和超声诊断子宫准确率均为 94%。结论 MRI 与超声诊断性发育异常患者的性腺和子宫准确率均较高, 超声对于盆腔内条索样卵巢组织显示略优于 MRI, MRI 对于盆腔和腹股沟区的睾丸组织显示较优于超声, 两者对于性发育异常患者的非条索样卵巢组织和子宫均显示良好。联合 2 种诊断方法, 可提高性腺和子宫诊断的准确率。

【关键词】 核磁共振成像; 两性畸形; 超声检查; 性发育异常

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Application of magnetic resonance imaging and ultrasound in diagnosis of disorder of sexual development

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【Abstract】 Objective To investigate the application of magnetic resonance imaging (MRI) and ultrasound in the diagnosis of disorder of sexual development, and to compare the imaging results with the surgical and pathological results to improve the diagnosis of disorder of sexual development. **Methods** This present retrospective cases series included 43 patients who were diagnosed disorder of sexual development in the First Affiliated Hospital of Zhengzhou University from April 2007 to September 2018. There were 17 patients undergoing laparoscopic gonad exploration or resection, analysis their MRI, ultrasound and surgical pathology results. **Results** For these 17 patients with disorder of sexual development, 30 glands were found during surgery. Among all these 30 glands, 22 were detected by MRI with an accuracy rate of 76.4%, 16 were detected by MRI with an accuracy rate of 58.8%, and 24 were detected by the combination of MRI and ultrasound with an accuracy rate of 82.3%. The accuracy rate of glands in MRI combined ultrasound group was significantly higher than that in ultrasound group ($P=0.031$). Between MRI combined ultrasound group and MRI group, there was no significant difference in the accuracy rate of detective glands ($P>0.05$). In 17 patients with disorder of sexual development, 12 cases of uterus were observed in surgical, 13 cases were diagnosed by MRI, 1 case was over-diagnosed; 11 cases were observed in ultrasound, and 1 case was missed. The correct rate of MRI/ultrasound diagnosis for uterus was 94%. **Conclusion** MRI and ultrasound have high accuracy for the diagnosis of gonad and uterus dysplasia. Ultrasound is superior to MRI in detecting pelvic ovarian tissue. The MRI is better at showing the testicular tissue in the pelvic and inguinal than ultrasound, both of the MRI and ultrasound show could clear ovarian tissue and uterus in patients with disorder of sexual development; the combination with these two methods can improve the accuracy of gonad and uterus diagnosis.

【Key words】 Magnetic resonance imaging; Hermaphroditism; Ultrasound; Disorder of development

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奥利司他治疗肥胖型多囊卵巢综合征的研究进展

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【摘要】 多囊卵巢综合征 (PCOS) 是一种常见的妇科内分泌综合征, 以代谢异常及生殖功能障碍为主要特征, 临床表现包括排卵异常、高雄激素血症及卵巢多囊样表现。大部分 PCOS 患者存在超重或肥胖, 尤其是中心型肥胖, 这加重 PCOS 临床表现, 最终增加不孕的风险。奥利司他是国家唯一批准的减肥药物, 其作为一种长效胃肠道脂肪酶抑制剂, 能有效减少人体对脂肪的吸收, 增加脂肪排泄, 同时改变内脏脂肪因子水平、稳定全身炎症反应, 调节能量代谢, 从而达到减重目的。奥利司他可有效降低肥胖型 PCOS 患者的体质量, 改善胰岛素抵抗及脂代谢异常, 纠正性激素紊乱, 增加排卵率, 对肥胖型 PCOS 患者的妊娠结局产生积极的影响。本文对奥利司他治疗肥胖型多囊卵巢综合征的研究进展进行综述。

【关键词】 多囊卵巢综合征; 肥胖; 奥利司他; 胰岛素抵抗; 脂代谢异常; 高雄激素血症; 排卵障碍

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Research progress of orlistat on metabolic and ovulatory disorders in obese polycystic ovary syndrome patients

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【Abstract】 Polycystic ovary syndrome (PCOS) is a common gynecological endocrine syndrome characterized by metabolic abnormality and reproductive dysfunction, including ovulation abnormality, hyperandrogenism and polycystic ovarian manifestations. Most PCOS patients are overweight or obese, especially the central obesity, which aggravates the clinical manifestations of PCOS and increases the risk of infertility ultimately. Orlistat is the only weight loss drug approved by many countries. As a long-lasting gastrointestinal lipase inhibitor, orlistat can effectively reduce the absorption of lipid and increase lipid excretion of human body, regulate the level of visceral adipose factor, stabilize systemic inflammatory reaction, and improve energy metabolism, so as to achieve the purpose of weight loss. Orlistat can reduce the weight of obese PCOS patients, improve lipid metabolism and insulin resistance, alter sex hormone disorder, induce ovulation, and have positive effect on the pregnancy outcome. This paper reviewed the research progress of orlistat in treatment of obese PCOS patients.

【Key words】 Polycystic ovary syndrome; Obesity; Orlistat; Insulin resistance; Dislipidmia; Hyperandrogenism; Ovulatory disorders

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未成熟卵体外培养与印记基因甲基化研究进展

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【摘要】卵母细胞体外成熟(IVM)是一项试管婴儿领域的前沿技术,适用于缺乏成熟卵母细胞的患者,已被应用到临床辅助生殖技术中。它可以减少促性腺激素对患者的刺激,消除多囊卵巢综合征(PCOS)患者出现卵巢过度刺激综合征(OHSS)的风险,具有减少治疗负担和成本的优势。但值得关注的是,卵母细胞的培养可能会干扰发育过程中的表观重新编程,导致子代出生缺陷。本文将从IVM对印记基因表达、早期胚胎发育能力、印记基因甲基化的影响以及胚胎培养对甲基化的影响等方面做一综述。

【关键词】 体外成熟; 辅助生殖; 印记基因; DNA 甲基化

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Advances in imprinted DNA methylation of *in vitro* culture of immature oocytes

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【Abstract】 *In vitro* maturation (IVM) of oocytes, a frontier technique in *in vitro* fertilization (IVF) field, specifically targeting at some infertile patients with egg maturation disorders, have been introduced into the clinical assisted reproductive technology. It is a mild approach to replace conventional ovarian stimulation for polycystic ovary syndrome (PCOS) patients and has advantages of reducing the burden and cost of treatment. However, it is noteworthy that oocyte culture may interfere with epigenetic reprogramming of the development process, leading to birth defects in the offspring. This review will talk about impression of IVM on expression of imprinted genes, early embryonic development and imprinted gene methylation and impression of embryo culture on the methylation.

【Key words】 *In vitro* maturation; Assisted reproduction; Imprinted gene; DNA methylation

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哺乳动物睾丸精子发生中 Wnt 信号通路的研究进展

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【摘要】 Wnt 信号通路在哺乳动物睾丸精子发生过程中发挥着重要作用, 其异常与男性不育密切相关。本文综述了 Wnt 信号通路在原始生殖细胞增殖、精原细胞自我更新、精子发生和睾丸体细胞中的调控作用及其分子机制, 探讨了 Wnt 信号通路与男性不育的关系及用于研究男性生育功能 Wnt 信号通路动物模型, 并总结了哺乳动物睾丸精子发生中 Wnt 信号通路的研究进展。

【关键词】 Wnt 信号通路; β -catenin; 睾丸; 精子发生

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Roles of Wnt signaling pathway in mammalian testicular spermatogenesis

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【Abstract】 Wnt signaling pathway presents critical roles in mammalian testicular spermatogenesis while the abnormality of Wnt signaling is closely related to male infertility. This article summarizes the regulation function and molecular mechanism of Wnt signaling pathway in primary germ cell proliferation, spermatogonial cell self-renew, spermatogenesis and testicular somatic cell. Moreover, we introduce the relationship between Wnt signaling pathway and male infertility and a number of animal models related to Wnt signaling pathway. Finally, we describe the study progress of Wnt signaling pathway in mammalian testicular spermatogenesis.

【Key words】 Wnt signaling pathway; β -catenin; Testis; Spermatogenesis

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实时荧光定量聚合酶链式反应技术在 B 族链球菌检测中的应用研究进展

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【摘要】 B 族链球菌 (GBS) 是围产期孕妇感染导致新生儿感染致病的主要致病菌之一, 可引起新生儿肺炎、败血症、脑膜炎等早期侵入性感染, 严重的甚至会导致死亡。本文综述了金标准培养法、快速培养法与实时荧光定量聚合酶链式反应 (PCR) 法在孕产妇检测 GBS 阳性率、敏感度和特异度方面的差异, 对不同孕周的孕妇采用何种检测方法提出了建议, 以期能够在全国范围内普及 GBS 的筛查和预防, 达到降低母婴并发症的目的。

【关键词】 B 族链球菌; 孕产妇; 培养法; 实时荧光定量聚合酶链式反应技术

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Application of real-time fluorescence quantitative polymerase chain reaction in detection of group B streptococcus

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【Abstract】 Group B Streptococcus (GBS) is one of the main pathogens causing neonatal infections in perinatal pregnant women, which can cause early invasive infections such as neonatal pneumonia, sepsis, meningitis, and even serious death. This article reviews the differences between the gold standard culture method, the rapid culture method and the real-time fluorescent quantitative polymerase chain reaction (PCR) method in the positive rate, sensitivity and specificity of maternal detection of GBS, and puts forward some suggestions for the detection methods used by pregnant women in different gestational weeks. This review suggested that screening and prevention of GBS nationwide will reduce maternal and child complications.

【Key words】 Group B streptococcus; Maternal; Culture method; Real-time fluorescence quantitative polymerase chain reaction technology

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