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编 辑

中华生殖与避孕杂志编辑委员会
200237, 上海市老沪闵路 779 号
电话: (021)64438169
传真: (021)64438975
Email: randc@sippr.org.cn
http://www.randc.cn

总编辑

乔 杰

编辑部主任

王黎茜

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779 Laohumin Road, Shanghai 200237, China

Tel: 0086-21-64438169
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Editor-in-Chief

Qiao Jie (乔杰)

Managing Director

Wang Lixi (王黎茜)

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基于人体成分测定进行互联网线上生活方式干预在多囊卵巢综合征患者治疗中作用的多中心前瞻性研究

唐玉珠¹ 苏椿淋² 王经纬¹ 何援利³ 王小红⁴ 施如霞⁵ 胡翠芳⁶ 冯杏娟⁷ 陈卫民⁸
陈琴妹⁹ 林金芳² 毕烨¹

¹ 爱丁优生助孕互联网连锁门诊, 上海 200040; ² 复旦大学附属妇产科医院, 上海 200011;
³ 南方医科大学珠江医院, 广州 510000; ⁴ 中国人民解放军 101 医院, 无锡 214000; ⁵ 南京
医科大学附属常州市第二人民医院 213000; ⁶ 杭州市余杭区中医院 311100; ⁷ 宜兴市中医
医院 214200; ⁸ 桐乡市妇幼保健院 314500; ⁹ 漳州市第三医院 363000
通信作者: 林金芳, Email: linjinfang2002@126.com, 电话: +86-15921516258; 毕烨,
Email: angelbi@ibaby-plan.com, 电话: +86-13611904555

【摘要】 目的 探讨基于患者体成分特征, 通过互联网线上生活方式干预对多囊卵巢综合征 (PCOS) 患者的治疗作用。方法 纳入 2017 年 5 月—2018 年 3 月期间在爱丁互联网连锁门诊上海、杭州、深圳门诊及国内 8 家妇产科医院自愿参与互联网线上生活方式干预治疗的 103 例 PCOS 患者, 根据体质量指数 (BMI) 分为超重和肥胖组 ($BMI \geq 24 \text{ kg/m}^2$) 和非肥胖组 ($BMI < 24 \text{ kg/m}^2$); 基于患者体成分测定结果, 制定个体化的饮食和运动干预方案并进行微信群组管理。12 周后比较干预前后患者的体成分变化与生殖激素、胰岛素抵抗 (IR) 改善情况和自发排卵恢复情况; 并分析这些指标变化与患者排卵恢复的相关性。**结果** 经 12 周的生活方式干预后: ①超重和肥胖组和非肥胖组体脂率均明显降低 ($P < 0.01$); 非肥胖组的骨骼肌占比明显升高 ($P < 0.01$); ②超重和肥胖组和非肥胖组胰岛素抵抗指数 (HOMA-IR) 和胰岛素释放试验曲线下面积均明显降低 (均 $P < 0.01$), 其中有 4 例糖尿病患者 (超重和肥胖组与非肥胖组各 2 例) 糖耐量均较前改善; ③超重和肥胖组脂肪率下降与 HOMA-IR 降低呈正相关 ($r = 0.368, P = 0.021$), 非肥胖组患者骨骼肌占比升高与 HOMA-IR 值变化呈明显负相关 ($r = -0.512, P = 0.001$); ④超重和肥胖组的自发排卵恢复率为 60.9%(28/46), 非肥胖组为 72.1%(31/43), 均较治疗前明显升高 ($P < 0.001$); 且超重和肥胖组自发排卵恢复与体脂率下降呈正相关 ($r = 0.343, P = 0.003$), 非肥胖组自发排卵恢复则与骨骼肌占比升高呈正相关 ($r = 0.506, P = 0.001$)。**结论** 根据患者体成分特征制定个体化的减脂或 / 及增肌生活方式干预使超重和肥胖 PCOS 患者脂肪率降低, 非肥胖 PCOS 患者骨骼肌占比升高, 可提高患者胰岛素敏感性, 进而促进患者排卵功能的恢复; 基于体成分的生活方式干预才是精准、科学的生活方式干预。

【关键词】 多囊卵巢综合征; 胰岛素抵抗; 体成分; 生活方式干预; 互联网线上服务平台

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A multicenter prospective study on online lifestyle intervention in women with polycystic ovary syndrome based on the analysis of their body composition

Tang Yuzhu¹, Su Chunlin², Wang Jingwei¹, He Yuanli³, Wang Xiaohong⁴, Shi Ruxia⁵, Hu Cuiyang⁶, Feng Xingjuan⁷, Chen Weimin⁸, Chen Qinmei⁹, Lin Jinfang², Bi Ye¹

¹Eden Outpatient, Shanghai 200040, China; ²Obstetrics and Gynecology Hospital of Fudan University, Shanghai 200032, China; ³Zhujiang Hospital of Southern Medical University, Guangzhou 510000, China; ⁴The 101 Hospital of the Chinese People's Liberation Army, Wuxi 214000, China; ⁵Changzhou Second People's Hospital Affiliated to Nanjing Medical University, Changzhou 213000, China; ⁶Yuhang District Hospital of Traditional Chinese Medicine, Hangzhou 311100, China; ⁷Yixing Hospital of Traditional Chinese Medicine, Yixing 214200, China; ⁸Tongxiang Maternal and Child Health Hospital, Tongxiang 314500, China; ⁹Zhangzhou Third Hospital, Zhangzhou 363000, China

Corresponding author: Lin Jinfang, Email: linjinfang2002@126.com, Tel: +86-15921516258; Bi Ye,

Email: angelbi@ibaby-plan.com, Tel: +86-13611904555

【Abstract】 Objective To evaluate the effect of an online intervention program based on the analysis of human body composition on reproductive and metabolic abnormalities in polycystic ovary syndrome (PCOS) women. **Methods** A total of 103 patients with PCOS were recruited from May 2017 to March 2018 in Eden Outpatient and other 8 hospitals, and divided into 2 groups: overweight and obese group [body mass index (BMI) ≥ 24 kg/m²] and non-obese group (BMI < 24 kg/m²). The individualized diet and exercise program was formulated for these PCOS patients. Over the 12 weeks intervention, diet and exercise of the patients was recorded using WeChat Mini Programs. After intervention, changes in body composition, insulin resistance (IR) and ovulation were monitored and their correlations were analyzed. **Results** After 12 weeks of treatment, 1) body fat percentage of both groups significantly decreased ($P < 0.01$), while only skeletal muscle mass percentage increased in non-obese group ($P < 0.01$); 2) homeostasis model assessment-insulin resistance index (HOMA-IR) and insulin area under curve in both groups significantly decreased ($P < 0.01$), and intervention improved glucose tolerance in 4 diabetic patients (2 cases in overweight and obese group, 2 cases in non-obese group); 3) the decrease of HOMA-IR in overweight and obese group was positively correlated with the decrease of body fat percentage in overweight and obese group ($r = 0.368$, $P = 0.021$); while, negatively correlated with the increase of skeletal muscle mass percentage in non-obese group ($r = -0.512$, $P = 0.001$); 4) the recoveries of spontaneous ovulation in overweight and obese group and non-obese group were 60.9% (28/46) and 72.1% (31/43), respectively. The recovery of ovulation was positively correlated with the decrease of body fat percentage in the overweight and obese group ($r = 0.343$, $P = 0.003$); while, positively correlated with the increase of skeletal muscle mass percent in non-obese group ($r = 0.506$, $P = 0.001$). **Conclusion** According to the body composition, an individualized lifestyle intervention reduces body fat percentage of obese PCOS patients and increases skeletal muscle body mass in non-obese PCOS patients, then improves IR and recover spontaneous ovulation. The intervention of lifestyle based on body composition is precise and scientific intervention of lifestyle.

【Key words】 Polycystic ovary syndrome; Insulin resistance; Body composition; Lifestyle intervention; Online service platform

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促性腺激素释放激素激动剂联合人绒毛膜促性腺激素扳机可改善不良受精结局史患者的体外受精 / 卵胞质内单精子显微注射治疗结局

杨硕 梁靛 何艺磊 陈新娜 王颖 李红真 李蓉 王海燕

北京大学第三医院妇产科生殖医学中心 100191

通信作者: 陈新娜, Email: xinnachen70@hotmail.com, 电话: +86-10-82266849

【摘要】目的 比较有不良受精结局史患者前后 2 次不同治疗方案体外受精 (IVF)/ 卵胞质内单精子显微注射 (ICSI) 治疗结局, 探索促性腺激素释放激素激动剂 (GnRH-a) 联合标准剂量人绒毛膜促性腺激素 (hCG) 扳机在拮抗剂方案中的应用是否能改善治疗结局。**方法** 回顾性自身对照研究, 分析 2014 年 1 月 1 日—2015 年 12 月 31 日在北京大学第三医院生殖医学中心接受 IVF/ICSI 助孕, 行 GnRH 拮抗剂 (GnRH-A) 灵活方案及 GnRH-a 联合标准剂量 hCG 扳机的 71 例患者临床资料, 既往有接受标准剂量 hCG 扳机后, 因受精率低或无优质胚胎致妊娠失败病史。对患者 2 次治疗过程及结局进行比较分析。**结果** 患者初次接受 IVF 治疗年龄为 (31.8±3.9) 岁, 范围为 20~40 岁, 原发不孕占 78.9%。GnRH-a 联合标准剂量 hCG 扳机组促性腺激素 (Gn) 起始剂量 [(258.4±93.7) IU] 高于 hCG 扳机组 [(215.0±90.7) IU], 但 Gn 使用时间较短 [(10±1) d 比 (12±3) d, P 均 <0.001], 联合扳机组 Gn 使用总量 [(2 472.0±913.6) IU] 低于 hCG 扳机组 [(2 846.8±1 243.2) IU, $P=0.001$]。联合扳机的获卵数 (14±9) 和 ICSI 授精率 (76.1%) 均显著高于 hCG 扳机组 (12±6, 38.1%, P 值分别为 0.022 及 <0.001)。2 种治疗方案 M_{II} 卵率差异无统计学意义 ($P>0.05$)。联合扳机组的受精率 (54.6%)、2 原核 (PN) 率 (45.8%) 均显著高于 hCG 扳机组 (38.1%, 25.3%, P 均 <0.001)。联合扳机组临床妊娠率 (44.6%)、着床率 (29.4%) 及活产率 (35.7%) 均显著高于 hCG 扳机组 (2.5%, 1.4%, 0, P 均 <0.001)。**结论** 对于既往 IVF 治疗失败的低受精率或无优质胚胎史的患者, 采用 GnRH-a 联合标准剂量 hCG 扳机的拮抗剂方案, 能显著改善治疗结局。

【关键词】 促性腺激素释放激素拮抗剂; 控制性卵巢刺激; 联合扳机; 促性腺激素释放激素激动剂扳机

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Gonadotropin releasing hormone agonist and standard dosage of human chorionic gonadotropin trigger improve the *in vitro* fertilization and embryo transfer/intracytoplasmic sperm injection treatment prognosis of patients with history of poor fertilization outcomes

Yang Shuo, Liang Liang, He Yilei, Chen Xinna, Wang Ying, Li Hongzhen, Li Rong, Wang Haiyan

Reproductive Medical Science Center, Obstetrics and Gynecology Department, Peking University Third Hospital, Beijing 100191, China

Corresponding author: Chen Xinna, Email: xinnachen70@hotmail.com, Tel: +86-10-82266849

【Abstract】 Objective To investigate whether combined trigger [gonadotropin releasing hormone (GnRH) agonist (GnRH-a) combined with standard dosage human chorionic gonadotropin (hCG) trigger] in GnRH antagonist protocol could improve the treatment outcomes of patients with history of poor fertilization outcomes (low fertilization rate or no valuable embryo due to poor oocyte quality). **Methods** This was a retrospective self-controlled study. The study period was between Jan. 1st 2014 and Dec. 31st 2015. All patients were accepted GnRH antagonist flexible protocol and GnRH-a and standard dosage of hCG trigger with history of poor fertilization outcomes followed standard hCG trigger. The relative data were analyzed. **Results** The age was (31.8 ± 3.9) (range from 20 to 40) years old, 78.9% of them were primary infertility. Compared with hCG trigger group, the initial dosage of gonadotropin (Gn) used was significantly higher in combined trigger group [(258.4 ± 93.7) IU vs. (215.0 ± 90.7) IU, $P=0.001$] and the duration of Gn used stimulation was significantly shorter in combined trigger group [(10 ± 1) d vs. (12 ± 3) d, $P<0.001$]. The total dosage of Gn used was significantly lower in combined trigger group [$(2\ 472.0 \pm 913.6)$ IU vs. $(2\ 846.8 \pm 1\ 243.2)$ IU, $P=0.001$]. The number of oocyte pick up and fertilization rate were significantly higher in combined trigger group (14 ± 9 vs. 12 ± 6 , 54.6% vs. 38.1%, respectively, $P=0.022$, $P<0.001$). The rate of M_{II} oocyte was comparable between the two groups. The 2 pronucleus (PN) oocyte rate was significantly higher in combined group (45.8% vs. 25.3%, $P<0.001$). The clinical pregnancy rate, the implantation rate and the live birth rate were significantly higher in combined trigger group (44.6% vs. 2.5%, 29.4% vs. 1.4%, 35.7% vs. 0, respectively, all $P<0.001$). **Conclusion** The GnRH antagonist protocol with GnRH-a and standard dosage of hCG trigger significantly improve the live birth rate of patients with history of low fertilization rate or no valuable embryo due to poor oocyte quality.

【Key words】 Gonadotropin releasing hormone antagonist protocol; Controlled ovarian stimulation; Gonadotropin releasing hormone agonist trigger; Combined trigger

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复发性流产患者 CD4⁺T 细胞及调节性 T 细胞上 T 细胞免疫球蛋白和免疫受体酪氨酸抑制基序的表达

梁昀 段忠亮 李翠 李大金 王凌

复旦大学附属妇产科医院, 上海 200011

通信作者: 王凌, Email: dr.wangling@fudan.edu.cn, 电话: +86-21-33189900

【摘要】 目的 探讨 CD4⁺T 细胞及调节性 T(Treg) 细胞上 T 细胞免疫球蛋白和免疫受体酪氨酸抑制基序 (T cell immunoglobulin and immunoreceptor tyrosine-based inhibitory motif domain, TIGIT) 与复发性流产 (RSA) 发病的关系。方法 采用前瞻性病例 - 对照研究收集 2017 年 7 月—2018 年 8 月期间在复旦大学附属妇产科医院的 60 例 RSA 患者 (RSA 组) 和 68 例相同孕周正常早孕者 (对照组) 的外周血。采用流式细胞术检测抗凝外周血中 CD4⁺T 细胞及 Treg 细胞上表面分子 TIGIT 的百分含量。结果 CD4⁺T 细胞在外周血中的比例组间比较差异无统计学意义, 且 TIGIT⁺CD4⁺T 细胞的比例组间差异也无统计学意义 ($P>0.05$); Treg 细胞在 RSA 组外周血中的比例低于对照组 ($P=0.02$); 但 RSA 组 TIGIT⁺FoxP3⁺CD4⁺T 细胞所占比例为 $56.41\% \pm 12.36\%$, 高于对照组中的表达 ($47.82\% \pm 10.53\%$), 差异有统计学意义 ($P=0.03$)。结论 TIGIT 在 RSA 患者外周血 Treg 细胞上的表达异常升高, 提示其与 RSA 的发生可能相关。

【关键词】 复发性流产; 调节性 T 细胞; T 细胞免疫球蛋白和免疫受体酪氨酸抑制基序; CD4⁺T 细胞

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· 临床研究 ·

Expression of T cell immunoglobulin and immunoreceptor tyrosine-based inhibitory motif domain on CD4⁺T cells and regulatory T cells in recurrent spontaneous abortion patients

Liang Yun, Duan Zhongliang, Li Cui, Li Dajin, Wang Ling

Obstetrics and Gynecology Hospital of Fudan University, Shanghai 200011, China

Corresponding author: Wang Ling, Email: dr.wangling@fudan.edu.cn, Tel: +86-21-33189900

【Abstract】 Objective To evaluate the correlation of T cell immunoglobulin and immunoreceptor tyrosine-based inhibitory motif domain (TIGIT) on peripheral CD4⁺T cells and regulatory T (Treg) cells with recurrent spontaneous abortion (RSA). **Methods** Totally 60 RSA patients (RSA group) and 68 normal pregnant women (control group) were collected in Obstetrics and Gynecology Hospital of Fudan University during July 2017 to August 2018. Flow cytometry was used to detect the proportion of TIGIT⁺T cells on CD4⁺T cells and Treg cells. **Results** Compared with normal pregnant women, the proportion of CD4⁺T and TIGIT⁺CD4⁺T cells in RSA patients were not different, the proportion of Treg cells was lower in RSA group (5.08%±1.94%) than in control group (3.15%±1.16%) ($P=0.02$), but the proportions of TIGIT⁺FoxP3⁺CD4⁺T in RSA group (56.41%±12.36%) was higher than that in control group (47.82%±10.53%) ($P=0.03$). **Conclusion** The abnormal expression of TIGIT on Treg cells in RSA patients, may be related to the occurrence of RSA, which may be a new therapeutic target for RSA.

【Key words】 Recurrent spontaneous abortion; Regulatory T cell; T cell immunoglobulin and immunoreceptor tyrosine-based inhibitory motif domain; CD4⁺T cell

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133 种隐性遗传病相关基因变异在 200 例中国人群中的分布研究

王晓晔¹ 范蒙洁¹ 李锐² 周虹³

¹ 北京大学第三医院 100191; ² 北京诺禾致源科技股份有限公司 100015; ³ 北京大学医学部公共卫生学院 100191

通信作者: 周虹, Email: zhouhong7811@163.com, 电话: +86-10-82801222*105

【摘要】目的 探究中国人群中高频携带的基因突变及相对应的疾病, 为确定遗传病携带者筛查疾病范围做参考。方法 选取从 2017 年 7 月—2018 年 7 月期间在北京诺禾致源科技股份有限公司做过全外显子测序的健康且无亲缘关系人群 200 例, 分析 133 种单基因隐性遗传病相关的 197 个基因, 筛选出变异位点, 按照美国医学遗传学与基因组学学会 (ACMG) 指南对其进行解读, 得出携带的变异位点致病性与否的结论, 并在总体样本中做统计分析。结果 甲状腺激素合成及功能障碍、非综合征耳聋和视网膜色素变性这 3 种疾病相关的基因突变在中国人群中不仅携带率高, 而且突变位点种类多。鉴定出 78 个突变位点, 其中有 4 个 (MYO15A c.5919G>A、TYR c.929_930insC、DUOX2 c.3329G>A、ABCB11 c.2842C>T) 经过分析解读, 被判断为致病位点, 在被测样本中为杂合突变, 是相应的携带者。并且, 还检测到 9 个从未报道过的新的突变类型, 这些突变为临床意义未明位点。结论 在 200 例中国人群中筛选出了高频携带的基因突变, 初步确定甲状腺激素合成及功能障碍、非综合征耳聋和视网膜色素变性等疾病可作为中国人群携带者筛查的重点对象。

【关键词】单基因遗传病; 测序; 隐性遗传; 携带者筛查; 基因变异

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Variations analysis of 133 recessive diseases carried by 200 Chinese samples

Wang Xiaoye¹, Fan Mengjie¹, Li Rui², Zhou Hong³

¹Peking University Third Hospital, Beijing 100191, China; ²Novogene Co. Ltd, Beijing 100015, China; ³School of Public Health, Health Science Center, Peking University, Beijing 100191, China

Corresponding author: Zhou Hong, Email: zhouhong7811@163.com, Tel: +86-10-82801222*105

【Abstract】 Objective To investigate the variants in the high frequency associated with corresponding diseases in Chinese population, and to identify disease coverage for carriers screening in China. **Methods** A total of 200 normal and unrelated Chinese samples who accepted whole exome sequencing in Novogene Co. Ltd from July 2017 to July 2018 were subjected to screen for the genes associated with 133 single-gene recessive diseases. Then the variants were identified and interpreted by American College of Medical Genetics and Genomics (ACMG) guidelines, which were analyzed as pathogenic or benign. A total variants detected in all of the sample were counted. **Results** It was found that the variants related to thyroid dysmorphogenesis, non-syndromic deafness and retinitis pigmentosa were not only highly carried in the Chinese population, but also had many mutation types. In addition, a total of 78 variants were identified. And 4 of them (MYO15A c.5919G>A, TYR c.929_930insC, DUOX2 c.3329G>A, ABCB11 c.2842C>T) were analyzed as pathogenic mutations, which were heterozygous and carried by four individuals. Moreover, 9 novel mutations were found that have never been reported, and these mutations were considered as uncertain significance. **Conclusion** High-frequency genetic mutations with the corresponding diseases were identified in 200 Chinese populations. Preliminary conclusions indicate that thyroid dysmorphogenesis, non-syndromic deafness and retinitis pigmentosa can be the focus for carriers screening in China.

【Key words】 Monogenic genetic disease; Sequencing; Recessive inheritance; Carrier screening; Gene variation

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鸦胆子苦醇调控小鼠雌性生殖细胞减数分裂启动及早期卵子发生

裘旭华 周吉 马汝钧 戈榭 林莹 姚兵

东部战区总医院生殖医学中心, 南京 210002

通信作者: 姚兵, Email: 2424572228@qq.com, 电话: +86-25-80860174

【摘要】目的 探讨鸦胆子苦醇对雌性生殖细胞减数分裂启动及早期卵子发生的影响。**方法** 6~8 周小鼠雌雄合笼, 以雌性小鼠见阴栓记为胚胎 0.5 d (E0.5)。收集 E11.5、E12.5、E13.5、E14.5 的雌性胎鼠生殖嵴, 分别通过 qRT-PCR 及 Western blotting 检测核因子 E2(NF-E2) 相关因子 2(Nrf2)mRNA 及蛋白水平。分离 E12.5 雌性胎鼠的生殖嵴, 分别用二甲基亚砜(对照组)、10 nmol/L、20 nmol/L 的 Nrf2 抑制剂——鸦胆子苦醇、1 μ mol/L 视黄酸或 20 nmol/L 鸦胆子苦醇+1 μ mol/L 视黄酸处理 48 h 后, 检测 Nrf2 通路、减数分裂启动、视黄酸信号通路相关基因的 mRNA 水平。药物处理 48 h 后继续培养 10 d, 对体外培养的生殖嵴行石蜡切片和 HE 染色进行原始卵泡计数。**结果** 与对照组相比, 10 nmol/L、20 nmol/L 的鸦胆子苦醇显著下调减数分裂启动关键基因 *Stra8*、*Sycp3* 及 *Dazl* 的 mRNA 水平 ($P<0.05$)。与对照组的单位面积卵泡数量 (151.1 ± 6.8) 相比, 10 nmol/L、20 nmol/L 组的单位面积原始卵泡数量显著减少 (109.5 ± 12.2 , 49.1 ± 8.0) ($P<0.01$)。与对照组相比, 20 nmol/L 鸦胆子苦醇显著抑制视黄酸合成酶 ($P=0.001$) 及其受体 ($P=0.049$) 的表达。添加视黄酸能部分挽救鸦胆子苦醇对基因 *Raldh*、*RAR α* ($P<0.01$) 及基因 *Stra8*、*Sycp3* 及 *Dazl* 的表达抑制作用 ($P<0.01$)。**结论** 鸦胆子苦醇通过抑制 Nrf2 通路调控减数分裂启动及早期卵子发生。

【关键词】 核因子 E2 相关因子 2; 鸦胆子苦醇; 生殖嵴; 视黄酸; 小鼠

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Brusatol regulates female mouse germ cell meiosis initiation and early oogenesis

Qiu Xuhua, Zhou Ji, Ma Rujun, Ge Xie, Lin Ying, Yao Bing

Reproductive Medical Center, Jinling Hospital, Nanjing 210002, China

Corresponding author: Yao Bing, Email: 2424572228@qq.com, Tel: +86-25-80860174

【Abstract】 Objective To investigate the effect of brusatol on meiosis initiation and early oogenesis.

Methods Mating was timed overnight and the appearance of the vaginal plug was considered as embryonic 0.5 d (E0.5) in the next morning. Female genital ridges (GRs) were collected from E11.5, E12.5, E13.5, E14.5 fetal mice. The protein and mRNA levels of nuclear factor-E2 related factor 2 (Nrf2) were then tested by qRT-PCR and Western blotting, respectively. The isolated female GRs (E12.5) were incubated with dimethyl sulfoxide (DMSO, control group), 10 nmol/L and 20 nmol/L of brusatol, 1 μ mol/L of retinoic acid (RA), or 20 nmol/L of brusatol+1 μ mol/L of RA for 48 h. Some of the treated GRs were used to analyze the mRNA levels of the genes that related with Nrf2 pathway, meiosis initiation and RA pathway. The others were cultured for additional 10 d to test the primordial follicle formation by paraffin sectioning and HE staining. **Results** Brusatol treatment not only downregulated mRNA levels of meiosis genes such as *Stra8*, *Sycp3* and *Dazl* ($P<0.05$), but also decreased the number of primordial follicles in the ovarian tissues (151.1 ± 6.8 vs. 109.5 ± 12.2 , $P<0.01$). The number of primordial follicles was further decreased by an increased brusatol treatment (109.5 ± 12.2 vs. 49.1 ± 8.0 , $P<0.01$). As the only inhibitor of Nrf2 pathway, brusatol was also confirmed to be effective in GR. Additional studies showed brusatol inhibited the expression of retinaldehyde dehydrogenases ($P=0.001$) and retinoic acid receptor α ($P=0.049$), and the inhibition of brusatol on *Stra8*, *Sycp3* and *Dazl* expression was partially rescued by the addition of RA ($P<0.01$). **Conclusion** Brusatol regulated meiosis initiation and early oogenesis in female germ cell via inhibiting Nrf2 pathway.

【Key words】 Nuclear factor-E2 related factor 2; Brusatol; Genital ridge; Retinoic acid; Mouse

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针灸改善子宫内膜容受性有效性 Meta 分析

李哲郎¹ 王婉雪¹ 谢易冉¹ 杨一华²

¹ 桂林医学院附属医院 541001; ² 广西医科大学第一附属医院生殖中心, 南宁 530021

通信作者: 杨一华, Email: workyyh@163, 电话: +86-15007737358

【摘要】目的 系统评价针灸改善子宫内膜容受性 (endometrium receptivity, ER) 的有效性。方法 通过检索中国知网、万方、PubMed 数据库有关针灸改善 ER 的临床随机对照研究。按照纳入和排除标准选择文献资料, 使用 RevMan5.3 进行 Meta 分析。对子宫动脉搏动指数 (pulsation index, PI)、子宫动脉血流阻力指数 (resistance index, RI)、子宫内膜厚度、临床妊娠率的数据分析评价并且综合比较针灸或针灸联合其他方法对 ER 的改善情况。结果 共纳入 15 篇文献, 仅用针灸或针灸联合其他治疗方法能有效改善子宫动脉 PI($P<0.000\ 01$)、子宫动脉血流 RI($P<0.000\ 01$)、子宫内膜厚度 ($P<0.000\ 01$)、A 型子宫内膜 ($P<0.000\ 01$)、临床妊娠率 ($P<0.000\ 01$)。结论 针灸或针灸联合其他治疗方法对 ER 的改善情况比不使用针灸的效果更好。

【关键词】 Meta 分析; 针灸; 子宫内膜容受性

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Acupuncture can improve the endometrium receptivity: a Meta analysis

Li Zheyun¹, Wang Wanxue¹, Xie Yiran¹, Yang Yihua²

¹The Affiliated Hospital of Guilin Medical University, Guilin 541001, China; ²Reproductive Medicine Center, the First Affiliated Hospital of Guangxi Medical University, Nanning 530021, China

Corresponding author: Yang Yihua, Email: workyyh@163, Tel: +86-15007737358

【Abstract】 Objective To systemically evaluate the effectiveness of acupuncture on improving the endometrium receptivity (ER). **Methods** The clinical randomized controlled studies on the improvement of ER by acupuncture were retrieved by Chinese moxibustion, Wanfang and PubMed database. According to the inclusion and exclusion criteria, the literatures were selected and RevMan5.3 was used for Meta analysis. The data of uterine artery pulsation index (PI), uterine artery blood flow resistance index (RI), endometrium thickness and clinical pregnancy rate were analyzed and evaluated, and the improvement of ER by acupuncture or acupuncture combined with other methods was compared. **Results** A total of 15 articles were included, and acupuncture or acupuncture combined with other methods could better improve uterine artery PI ($P<0.000\ 01$), uterine artery blood flow RI ($P<0.000\ 01$), endometrium thickness ($P<0.000\ 01$), type A endometrium ($P<0.000\ 01$) and clinical pregnancy rate ($P<0.000\ 01$). **Conclusion** The improvement of ER with acupuncture or moxibustion combined with other treatment methods is better than that without acupuncture.

【Key words】 Meta analysis; Acupuncture; Endometrium receptivity

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来曲唑联合拮抗剂方案在多囊卵巢综合征患者的应用

侯艳茹 韩红敬 沈浣 吴丹 王艳棕 蒋励

北京大学人民医院生殖中心 100044

通信作者: 韩红敬, Email: han_hhj@126.com, 电话: +86-10-88324439

【摘要】目的 探讨来曲唑联合拮抗剂超促排卵方案治疗多囊卵巢综合征 (PCOS) 患者的临床应用价值。**方法** 选取 2014 年 1 月—2016 年 12 月期间北京大学人民医院生殖中心收治的进行体外受精 / 卵胞质内单精子显微注射 (IVF/ICSI) 的 PCOS 患者 132 例进行回顾分析, 其中来曲唑 + 拮抗剂组 (A 组) 50 例, 拮抗剂组 (B 组) 82 例, 比较组间临床资料及妊娠结局。**结果** 患者的年龄、不孕年限、体质量指数 (BMI) 组间差异均无统计学意义 ($P > 0.05$); A 组患者促性腺激素 (Gn) 总用量、Gn 使用时间、Gn 平均用量、Gn 起始剂量均小于 B 组 ($P < 0.05$); A 组患者人绒毛膜促性腺激素 (hCG) 注射日血清雌二醇、孕酮、促黄体生成素 (LH) 水平与 B 组比较差异均有统计学意义 ($P < 0.05$), hCG 注射日内膜厚度组间差异无统计学意义 ($P > 0.05$); 雌二醇水平低于 B 组 [(1 777.66 ± 1 491.30) ng/L 比 (3 256.07 ± 1 666.42) ng/L], 而孕酮水平 [(1.72 ± 1.07) μg/L]、LH 水平 [(4.68 ± 3.32) IU/L] 均高于 B 组 [(1.16 ± 0.61) μg/L, (2.58 ± 3.16) IU/L]。获卵数、M_{II} 卵子数、可利用胚胎数、优质胚胎数组间差异均无统计学意义 ($P > 0.05$)。卵巢过度刺激综合征 (OHSS) 发生率 A 组为 0%(0/50), B 组为 1.22%(1/82), 新鲜胚胎移植率 A 组为 46.80%(22/47), B 组为 42.30%(33/78), 胚胎种植率 A 组为 42.42%(14/33), B 组为 46.42%(26/56), 周期取消率 A 组为 6.00%(3/50), B 组为 4.87%(4/82), 差异均无统计学意义 ($P > 0.05$)。每周期新鲜胚胎移植临床妊娠率 A 组为 50.00%(11/22), B 组为 51.52%(17/33), 每移植周期活产率 A 组为 50.00%(11/22), B 组为 42.42%(14/33), 自然流产率 A 组为 0%(0/11), B 组为 5.88%(1/17), 差异均无统计学意义 ($P > 0.05$)。**结论** 对于 PCOS 患者应用来曲唑联合拮抗剂方案可以明显减少 Gn 用量和使用时间, 并可降低 OHSS 发生率, 但并不降低每周临床妊娠率和活产率。

【关键词】 来曲唑; 多囊卵巢综合征; 促性腺激素释放激素拮抗剂; 超促排卵

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Application of letrozole inhibitors in polycystic ovary syndrome receiving gonadotropin-releasing hormone antagonist protocols

Hou Yanru, Han Hongjing, Shen Huan, Wu Dan, Wang Yanbin, Jiang Li

Reproductive Center, Peking University People's Hospital, Beijing 100044, China

Corresponding author: Han Hongjing, Email: han_hhj@126.com, Tel: +86-10-88324439

【Abstract】 Objective To investigate the effectiveness and safety of letrozole combined with gonadotropin-releasing hormone antagonist (GnRH-A) protocol in patients with polycystic ovary syndrome (PCOS) and receiving *in vitro* fertilization (IVF)/intracytoplasmic sperm injection (ICSI). **Methods** We retrospectively reviewed the medical documents of PCOS patients receiving IVF/ICSI in the Reproductive Medicine Center of Peking University People's Hospital from January 2014 to December 2016. Totally 132 patients were included and divided into two groups. Group A ($n=50$) received letrozole combined with GnRH-A protocol for controlled ovarian hyperstimulation (COH). Group B ($n=82$) received GnRH-A protocol. The clinical characteristics and pregnancy outcomes of the two groups were analyzed and compared. **Results** There were no significant differences in age, duration of infertility, body mass index (BMI) of the two groups ($P>0.05$). The initial and total dosage of gonadotropin (Gn) used and the duration of COH were significantly lower and shorter in group A than in group B ($P<0.05$), so as the serum estradiol on human chorionic gonadotrophin (hCG) injection day [$(1\ 777.66\pm 1\ 491.30)$ ng/L vs. $(3\ 256.07\pm 1\ 666.42)$ ng/L, $P<0.05$]. On the contrary, the serum progesterone [(1.72 ± 1.07) μ g/L vs. (1.16 ± 0.61) μ g/L, $P<0.05$] and luteinizing hormone [(4.68 ± 3.32) IU/L vs. (2.58 ± 3.16) IU/L, $P<0.05$] on hCG injection day were significantly higher in group A than in group B. Nevertheless, there was no significant difference in the endometrial thickness of the two groups on hCG injection day ($P>0.05$). We found no significant differences in the number of retrieved oocytes, MII oocytes and high-quality embryos between the two groups ($P>0.05$). There were no differences in the prevalence of ovarian hyperstimulation syndrome (OHSS) (0% vs. 1.22%), fresh embryo transplantation rate (46.80% vs. 42.30%), implantation rate (42.42% vs. 46.42%) and cycle cancellation rate (6.00% vs. 4.87%) between group A and group B ($P>0.05$). The clinical pregnancy rate, the live birth rate and the spontaneous abortion rate per embryo transfer were 50.00% (11/22), 50.00% (11/22) and 0% (0/11) in group A, respectively, showing no statistical difference with that of group B [51.52% (17/33), 42.42% (14/33), 5.88% (1/17), respectively]. **Conclusion** For PCOS patients receiving assisted reproductive technology (ART), letrozole combined with GnRH-A protocol can significantly reduce the total dosage of Gn used, COH duration and the risk of OHSS without reducing the clinical pregnancy rate per cycle and the live birth rate.

【Key words】 Letrozole; Polycystic ovary syndrome; Gonadotropin-releasing hormone antagonist; Controlled ovarian hyperstimulation

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金凤丸联合芬吗通可改善薄性子宫内膜不孕患者妊娠结局

刘艳红¹ 李燕¹ 肖素行¹ 冯春莲¹ 夏利敏²

¹ 邯郸市妇幼保健院 056001; ² 邯郸市中心医院 056001

通信作者: 刘艳红, Email: 13832006199@163.com, 电话: +86-13832006199

【摘要】 目的 观察金凤丸联合芬吗通在薄性子宫内膜不孕患者中的临床应用。方法 选取人绒毛膜促性腺激素 (hCG) 注射日子宫内膜 <7 mm 经氯米芬促排卵后不孕的肾阳虚型薄性子宫内膜患者 104 例, 按随机数字法随机分为对照组 (口服氯米芬和芬吗通治疗, $n=52$), 研究组 (提前 1 个周期口服金凤丸行预处理, 再予氯米芬和芬吗通联合金凤丸治疗, $n=52$), 两组均治疗 3 个周期, 比较两组治疗前、后以及治疗后妊娠组和非妊娠组在 hCG 注射日子宫内膜厚度、类型、血流及临床妊娠率。结果 研究组和对照组的子宫内膜厚度在治疗后 [(9.93±0.15) mm, (8.05±0.42) mm] 明显大于治疗前 [(5.97±0.16) mm, (5.99±0.14) mm, $P<0.01$], 且研究组治疗后的子宫内膜厚度明显大于对照组 ($P<0.01$)。研究组和对照组的子宫内膜类型、血流情况在治疗后比治疗前均有明显改善 ($P=0.01$, $P=0.04$; $P<0.01$, $P=0.04$), 治疗后研究组的子宫内膜血流改善情况与对照组差异有统计学意义 ($P=0.03$)。治疗后妊娠组的子宫内膜厚度 [(9.45±0.78) mm]、类型、血流等方面均较非妊娠组 [(8.59±1.00) mm] 有明显改善 ($P<0.01$, $P=0.04$, $P=0.04$)。治疗后研究组的妊娠成功率 (57.69%) 优于对照组 (40.62%) ($P=0.02$)。结论 金凤丸联合芬吗通对氯米芬促排卵过程中因子宫内膜薄而不孕的肾阳虚型患者, 可以有效地改善其子宫内膜厚度、类型、血流, 提高临床妊娠率。

【关键词】 氯米芬; 肾阳虚型不孕; 薄性子宫内膜; 金凤丸; 芬吗通

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Jinfeng Pills combined with femoston can improve pregnancy outcomes in the infertile patients with thin endometrium

Liu Yanhong¹, Li Yan¹, Xiao Suxing¹, Feng Chunlian¹, Xia Limin²

¹Handan Maternity and Child Care Centers, Handan 056001, China; ²Handan Central Hospital, Handan 056001, China

Corresponding author: Liu Yanhong, Email: 13832006199@163.com, Tel: +86-13832006199

【Abstract】 Objective To observe the application of Jinfeng Pills combined with femoston in the infertile patients with thin endometrium. **Methods** Total of 104 cases of infertility with thin endometrium after ovulation induction and insufficiency of the kidney-yang on the day of human chorionic gonadotropin (hCG) injection were randomly divided into control group (52 cases with oral clomiphene and femoston), and study group (52 cases, who were pretreated with oral Jinfeng Pills for one cycle, and then given clomiphene, femoston combined with Jinfeng Pills). The two groups were treated for three cycles. The endometrial thickness and type, blood flow, clinical pregnancy rate were compared between the two groups before and after the treatment, as well as between the pregnancy group and the non-pregnancy group on the day of ovulation. **Results** After treatment, endometrial thickness in both groups were significantly improved [(9.93±0.15) mm, (8.05±0.42) mm vs. (5.97±0.16) mm, (5.99±0.14) mm, $P<0.01$], and study group was superior to control group ($P<0.01$). Endometrium type and blood flow after treatment were significantly improved compared with those before treatment ($P=0.01$, $P=0.04$, $P<0.01$, $P=0.04$), and the endometrium blood flow in study group was superior to control group ($P=0.03$). After treatment, the endometrial thickness [(9.45±0.78) mm vs. (8.59±1.00) mm], type and blood flow in pregnancy group were significantly improved compared with non-pregnancy group ($P<0.01$, $P=0.04$, $P=0.04$). Study group was superior to control group in clinical pregnancy rate (57.69% vs. 40.62%, $P=0.02$). **Conclusion** The combination of Jinfeng Pills and femoston can effectively improve the endometrial thickness, type and blood flow of endometrium, and improve the clinical pregnancy rate in clomiphene-induced ovulation patients with thin endometrium and infertility due to insufficiency of the kidney-yang.

【Key words】 Clomiphene; Infertility patients with insufficiency of kidney-yang; Thin endometrium; Jinfeng Pills; Femoston

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人工授精前实时三维子宫输卵管超声造影对输卵管通畅性评估的有效性

彭琛 王迪 王霞 王青欣 彭灵娜 郭丰

南通大学附属医院生殖医学中心 226000

通信作者: 郭丰, Email: fguo@ntu.deu.cn, 电话: +86-513-81168133

【摘要】目的 探讨宫腔内人工授精 (intrauterine insemination, IUI) 前实时三维子宫输卵管超声造影 (real-time three-dimensional hysterosalpingocontrast sonography, RT-3D-HyCoSy) 对不孕患者输卵管通畅性评估的临床价值。方法 回顾性分析 2017 年 1—12 月期间在南通大学附属医院生殖医学中心进行夫精人工授精助孕的 242 例患者, 共 364 个周期。根据行 IUI 前输卵管通畅性检查方法的不同分为 RT-3D-HyCoSy 组 (A 组, 105 例, 161 个周期) 和 X 线子宫输卵管造影 (hysterosalpingography, HSG) 组 (B 组, 137 例, 203 个周期)。分析患者的临床基本资料、治疗方案和 IUI 妊娠结局。**结果** 在 364 个 IUI 治疗周期中, A 组和 B 组的自然周期和促排卵周期比例差别无统计学意义 ($P>0.05$); 两组患者排卵前子宫内膜厚度、排卵前最大卵泡直径、输卵管检查距离 IUI 的时间、处理后精子活力和前向精子总数, 差异均无统计学意义 ($P>0.05$); A 组和 B 组的临床妊娠率分别为 18.01% 和 16.26%, 差异亦无统计学意义 ($P>0.05$)。**结论** RT-3D-HyCoSy 能实时、快速、动态地评价输卵管通畅性, 显影清晰、安全无辐射、空间感强, 有较高的准确性, 用于 IUI 助孕前输卵管通畅性的评价, 安全有效。

【关键词】 不育症; 输卵管通畅性; 子宫输卵管造影术; 阴道超声检查; 实时三维; 人工授精

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Validity of real-time three-dimensional hysterosalpingocontrast sonography in evaluating hysterosalpingo patency before intrauterine insemination

Peng Chen, Wang Di, Wang Xia, Wang Qingxin, Peng Lingna, Guo Feng

Center for Reproductive Medicine of Affiliated Hospital of Nantong University, Nantong 226001, China

Corresponding author: Guo Feng, Email: fguo@ntu.deu.cn, Tel: +86-513-81168133

【Abstract】 Objective To explore the clinical value of real-time three-dimensional hysterosalpingocontrast sonography (RT-3D-HyCoSy) in evaluating hysterosalpingo patency before intrauterine insemination (IUI). **Methods** Totally 364 cycles (242 cases) of IUI were retrospectively analyzed in Center for Reproductive Medicine of Affiliated Hospital of Nantong University from January to December 2017. According to the method used for evaluating hysterosalpingo patency before IUI, these patients were divided into RT-3D-HyCoSy group (group A, 105 cases, 161 cycles) and hysterosalpingography (HSG) group (group B, 137 cases, 203 cycles). The basic clinical data, the treatment protocol and the pregnancy rate of IUI were analyzed. **Results** In 364 cycles of IUI, the ratio of natural cycle vs. ovulation induction cycle was not significantly different between the two groups ($P>0.05$). There were no differences in endometrial thickness on the day of human chorionic gonadotropin (hCG) injection, the follicle size before ovulation and the time gap between tube patency check to the date of IUI. The sperm motility and the total fast progressive sperms between the two groups were also not different ($P>0.05$). There was no difference in clinical pregnancy rate between group A (18.01%) and group B (16.26%) ($P>0.05$). **Conclusion** RT-3D-HyCoSy has many advantages as in real time, quickly and dynamically in tubal patency evaluation. It is also clear, safe, free of radiation and with high accuracy. RT-3D-HyCoSy is a safe and effective way in evaluating the tubal patency before IUI.

【Key words】 Infertility; Tubal patency; Hysterosalpingography; Transvaginal sonography; Real-time three-dimension; Artificial insemination

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生育保留治疗与辅助生殖技术在宫颈病变患者中的应用

王迎曦 甄秀梅 乔杰

北京大学第三医院生殖医学中心, 100091

通信作者: 乔杰, Email: jie.qiao@263.net, 电话 / 传真: +86-10-82265611

【摘要】 随着宫颈癌筛查的普及以及女性生育年龄的推迟, 越来越多的育龄女性在未生育前发现宫颈上皮内瘤变或早期宫颈癌。可依据患者宫颈病变的具体分期、年龄及生育需求制定不同的治疗方案, 对那些宫颈病变治疗后不孕或妊娠困难的患者可以进行辅助生殖技术助孕。辅助生殖技术在保留生育的宫颈病变及宫颈癌症患者中的应用, 其安全性及有效性还需要更进一步大样本的研究。

【关键词】 宫颈癌; 宫颈上皮内瘤变; 生育保留; 辅助生殖技术

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Fertility preservation and assisted reproductive techniques in cervical disease

Wang Yingxi, Zhen Xiumei, Qiao Jie

Reproductive Medical Center, Peking University Third Hospital, Beijing 100091, China

Corresponding author: Qiao Jie, Email: jie.qiao@263.net, Tel/Fax: +86-10-82265611

【Abstract】 With the popularization of cervical cancer screening and the delay of women's reproductive age, more and more women were found cervical disease before childbirth. Different treatments can be performed according to their condition, including the age of the patients, the specific stage of cervical cancer or cervical intraepithelial neoplasia and the demand of fertility. After receiving the treatment of cervical disease, some women can be infertile. They can increase the chance of pregnancy with the help of assisted reproductive technology. The safety and efficacy of assisted reproductive technology in patients with cervical lesions and cervical cancer need further large sample studies.

【Key words】 Cervical cancer; Cervical intraepithelial neoplasia; Fertility preserving; Assisted reproductive technology

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超声介入硬化治疗后输卵管积液成分的变化

周云¹ 姜宏¹ 高焕云² 王雪梅¹ 黄静¹

¹中国人民解放军第 105 医院生殖医学中心, 合肥 230031; ²泰安市中心医院 271000

周云现在安徽省第二人民医院生殖医学中心, 合肥 230041

通信作者: 姜宏, Email: jianghl05@sina.com, 电话: +86-551-65966361

【摘要】目的 探讨超声介入硬化治疗后输卵管积液成分及性质的改变。方法 2013 年 4 月—2016 年 4 月期间于中国人民解放军第 105 医院生殖医学中心采用随机数表法随机选取输卵管积液患者 16 例, 分别取超声介入硬化治疗前(A 组)和治疗后(B 组)输卵管积液样本各 16 份, 检测其 pH 值、K⁺、Na⁺、Cl⁻、Ca²⁺、Mg²⁺、总蛋白、葡萄糖浓度, 肿瘤坏死因子- α (TNF- α)、白血病抑制因子(LIF)、血管内皮生长因子(VEGF)、胰岛素样生长因子-1(IGF-1)、一氧化氮(NO)、内皮素-1(ET-1)、前列环素(PGI₂)、血栓素 A₂(TXA₂) 水平及细菌、支原体、衣原体、淋球菌阳性率, 进行自身对照比较。结果 B 组的 K⁺、Ca²⁺、总蛋白、葡萄糖浓度显著高于 A 组 ($P < 0.05$), TNF- α 水平 [(281.42 \pm 55.91) ng/L] 显著低于 A 组 [(339.18 \pm 59.74) ng/L] ($P = 0.03$); pH 值 (8.23 \pm 0.77)、支原体 (25.00%) 及衣原体阳性率 (12.50%) 虽低于 A 组 (8.46 \pm 0.82, 31.25%, 18.75%), 但差异无统计学意义 ($P > 0.05$)。两组细菌、淋球菌培养均未见阳性。结论 硬化治疗后输卵管积液部分成分包括 K⁺、Ca²⁺、总蛋白、葡萄糖浓度的升高及 TNF- α 水平的降低可能有助于降低其细胞毒性作用、改善子宫内膜容受性。

【关键词】输卵管; 硬化疗法; 子宫内膜

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Analysis of hydrosalpinx constituents after interventional ultrasound sclerotherapy

Zhou Yun¹, Jiang Hong¹, Gao Huanyun², Wang Xuemei¹, Huang Jing¹

¹Reproductive Medicine Center, 105 Hospital of People's Liberation Army, Hefei 230031, China; ²Taian Central Hospital, Taian 271000, China

Zhou Yun is working on the Reproductive Medicine Center, Anhui No. 2 Provincial People's Hospital, Hefei 230041, China

Corresponding author: Jiang Hong, Email: jianghl05@sina.com, Tel: +86-551-65966361

【Abstract】 Objective To investigate the constituent changes of hydrosalpinx after interventional ultrasound sclerotherapy. **Methods** Hydrosalpinx samples before and after interventional ultrasound sclerotherapy were collected from randomly selected 16 cases of hydrosalpinx and assigned into group A (before treatment) and group B (after treatment), then the measurement of pH, concentrations of K⁺, Na⁺, Cl⁻, Ca²⁺, Mg²⁺, protein, glucose, tumor necrosis factor (TNF)- α , leukemia inhibitory factor (LIF), vascular endothelial growth factor (VEGF), insulin-like growth factor (IGF)-1, nitric oxide (NO), endothelin (ET)-1, prostacyclin (PGI₂), thromboxane A₂ (TXA₂), and culture of bacteria, mycoplasma, chlamydia and gonococcus were carried out and compared between group A and group B. **Results** The pH values in hydrosalpinx were comparable before and after the sclerotherapy (8.46 ± 0.82 vs. 8.23 ± 0.77). The concentrations of K⁺, Ca²⁺, protein and glucose in group B were significantly higher than those in group A ($P < 0.05$), while the level of TNF- α in group B [(281.42 ± 55.91) ng/L] was significantly lower than that in group A [(339.18 ± 59.74) ng/L] ($P = 0.03$). The positive rates of mycoplasma and Chlamydia in group B (25.00%, 12.50%) were lower than those in group A (31.25%, 18.75%), but the difference did not reach statistical significance ($P > 0.05$). No bacterial and gonococcus growth were identified in all hydrosalpinx samples. **Conclusion** Increased concentrations of K⁺, Ca²⁺, protein, glucose and decreased TNF- α level in hydrosalpinx might be a possible mechanism that interventional ultrasound sclerotherapy could reduce embryonic toxicity and improve endometrial receptivity of the patients with hydrosalpinx.

【Key words】 Salpinx; Sclerotherapy; Endometrium

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促性腺激素释放激素激动剂用于黄体支持的相关研究进展

刘洋虹 黄开淑

湖南省常德市第一人民医院生殖中心 415003

通信作者：黄开淑，Email: 2733629298@qq.com，电话：+86-13511161302

【摘要】 辅助生殖技术 (ART) 过程中由于黄体功能不全 (LPD)，需要常规进行黄体支持 (LPS)。近年来研究表明促性腺激素释放激素激动剂 (GnRH-a) 能有效应用于 LPS，改善 ART 结局。目前有关其应用范围、最小有效剂量、给药时机以及用药方案尚未达成共识，有效作用机制尚不明确，可能与刺激黄体，直接作用于胚胎以及子宫内膜等存在 GnRH-a 受体相关。GnRH-a 用于 LPS 仍需要大样本、多中心研究，在不断探究其有效性过程中进一步明确其适用范围、作用机制及安全性，适时正确合理用药。

【关键词】 促性腺激素释放激素；辅助生殖技术；促性腺激素释放激素激动剂；黄体支持；临床结局

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Current progress of gonadotropin-releasing hormone agonist for the luteal phase support

Liu Yanghong, Huang Kaishu

Reproductive Center of the First Hospital of Changde City, Changde 415003, China

Corresponding author: Huang Kaishu, Email: 2733629298@qq.com, Tel: +86-13511161302

【Abstract】 As a clinical routine, luteal phase support (LPS) is recommended in assisted reproductive technique (ART) cycles due to luteal insufficiency (LPD). Administration of gonadotropin-releasing hormone agonist (GnRH-a) has been recently suggested as an alternative for LPS on ART to improve clinical outcomes in recent years. The exact underlying mechanism is still not clear, although it has been hypothesized that GnRH-a either supports the corpus luteum function or stimulates the GnRH-a receptors on the endometrium and embryo. It is necessary to further explore the formulation of GnRH-a, the scope, the minimal effective dosage, the most effective timing, protocol and safety, as well as its exact mechanism.

【Key words】 Gonadotropin-releasing hormone; Assisted reproductive technique; Gonadotropin-releasing hormone agonist; Luteal phase support; Clinical outcomes

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取卵后黄体期使用促性腺激素释放激素拮抗剂防治卵巢过度刺激综合征的研究进展

夏漪 谢青贞

武汉大学人民医院生殖医学中心 / 湖北省辅助生殖与胚胎发育医学临床研究中心 430060

通信作者: 谢青贞, Email: qingzhenxie@hotmail.com, 电话: +86-13296500268

【摘要】 卵巢过度刺激综合征 (ovarian hyperstimulation syndrome, OHSS) 是一种辅助生殖技术相关的常见并发症, 防治 OHSS 是辅助生殖技术的重点和难点, 且目前尚无针对此病的特效防治方法。促性腺激素释放激素拮抗剂 (gonadotropin-releasing hormone antagonist, GnRH-A) 可在体外受精 - 胚胎移植的不同阶段预防 OHSS, 卵巢刺激阶段常规使用是一级预防, OHSS 高危者采用 GnRH-A 方案 GnRH 激动剂 (GnRH-a) 扳机为二级预防, 采卵后的黄体期使用 GnRH-A 被称为三级预防。虽然取卵后使用 GnRH-A 防治 OHSS 将近有 20 年的历史, 但是该类研究仍然较少, 且目前并未作为临床上的常规推荐措施。然而近年来 GnRH-A 防治 OHSS 的潜力越来越受到重视。本文综述黄体期使用 GnRH-A 防治 OHSS 的进展和机制, 并展望其临床应用价值。

【关键词】 卵巢过度刺激综合征; 黄体; 血管内皮生长因子; 促性腺激素释放激素拮抗剂

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The progress of prevention and treatment of ovarian hyperstimulation syndrome by gonadotropin-releasing hormone antagonist administration in the luteal phase after oocyte retrieval

Xia Yi, Xie Qingzhen

Center for Reproductive Medicine Renmin Hospital of Wuhan University/Hubei Clinic Research Center for Assisted Reproductive Technology and Embryonic Development, Wuhan 430060, China

Corresponding author: Xie Qingzhen, Email: 2528433868@qq.com, Tel: +86-13296500268

【Abstract】 Ovarian hyperstimulation syndrome (OHSS) is a common complication associated with assisted reproductive technology, prevention and treatment of OHSS is important and difficult in assisted reproductive technology. The gonadotropin-releasing hormone antagonist (GnRH-A) can prevent OHSS in different stages of *in vitro* fertilization and embryo transfer (IVF-ET). The routine use in the ovarian stimulation stage is primary prevention, applying the antagonist scheme and GnRH-agonist (GnRH-a) trigger for the OHSS high-risk group belongs to the secondary prevention, and the use of OHSS in the luteal phase after the ovulation is called the tertiary prevention. Although the prevention and treatment of OHSS by GnRH-A is nearly 20 years, this kind of research is still rare, also it is not recommended in clinical practice at present. However, in recent years, the potential role of GnRH-A in the prevention and treatment of OHSS is increasingly concerned. In this review, mechanism of GnRH-A during luteal phase in preventing and treating are reviewed. Besides, the application value in future is prospected as well.

【Key words】 Ovarian hyperstimulation syndrome; Corpus luteum; Vascular endothelial growth factor; Gonadotropin-releasing hormone antagonist

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来曲唑预防卵巢过度刺激综合征的研究进展

谢瑞 胡琳莉

郑州大学第一附属医院生殖医学中心 450052

通信作者: 胡琳莉, Email: hulinli1999@163.com, 电话: +86-15890619576

【摘要】 卵巢过度刺激综合征 (OHSS) 是促排卵过程中的一种严重且常见的医源性并发症, 其发生与人绒毛膜促性腺激素 (hCG) 注射日雌激素高水平密切相关。有文献报道表明高雌激素水平可能和新生儿心血管疾病、孕妇血液高凝状态有关, OHSS 患者后代的智力发育降低也可能和孕前期高雌激素水平有关。临床上对于 OHSS 患者没有特异性疗法, 但近年来越来越多的报道指出来曲唑对降低雌激素水平、预防 OHSS 有显著临床效果。本文就近年来曲唑在预防 OHSS 上的应用进展进行分析总结。

【关键词】 卵巢过度刺激综合征; 雌激素; 来曲唑

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Advances in the prevention of ovarian hyperstimulation syndrome with letrozole

Xie Rui, Hu Linli

Center for Reproductive Medicine, the First Affiliated Hospital of Zhengzhou University, Zhengzhou 450052, China

Corresponding author: Hu Linli, Email: hulinli1999@163.com, Tel: +86-15890619576

【Abstract】 Ovarian hyperstimulation syndrome (OHSS) is a serious and common iatrogenic complication in the process of ovulation induction, which is closely related to the high level of estrogen on the human chorionic gonadotropin (hCG) injection day. It has been reported that high level of estrogen may be associated with neonatal cardiovascular disease in newborns and hypercoagulable state in pregnant women. The low mental development in the offspring of OHSS may also be related to high level of estrogen during pre-pregnancy. Clinically, there is no specific treatment for OHSS, but in recent years, more and more reports have indicated that letrozole has significant clinical effects on reducing estrogen levels and preventing the occurrence of OHSS. In this paper, recent advances in the application of letrozole to OHSS is analyzed and summarized.

【Key words】 Ovarian hyperstimulation syndrome; Estrogen; Letrozole

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内源性大麻素系统对子宫内膜容受性的作用

许欣 王丽丽 崔娜 张杰 郝桂敏

河北医科大学第二医院生殖医学科, 石家庄 050000

通信作者: 郝桂敏, Email: haoguimin@163.com, 电话: +86-13932158810

【摘要】 子宫内膜容受性主要是指孕激素介导的子宫内膜间质细胞向蜕膜细胞增殖、分化的过程, 对于胚胎植入的早期阶段是至关重要的。内源性大麻素系统 (ECS) 参与人体各种生理活动, 广泛分布于中枢神经系统, 对于代谢和生殖起着十分重要的调节作用。其中主要的内源性大麻素物质——N-花生四烯酰基乙醇胺 (AEA) 动态变化参与妊娠早期过程, 特别是胚胎种植期。本文就子宫内膜容受性与 ECS 间的关系进行综述, 探讨 ECS 对子宫内膜容受性的作用, 进一步阐述其对妊娠的影响。

【关键词】 内源性大麻素系统; 子宫内膜容受性; 生殖发育; 内源性大麻素受体; 蜕膜

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Effect of endocannabinoids system on endometrial receptivity

Xu Xin, Wang Lili, Cui Na, Zhang Jie, Hao Guimin

Department of Reproductive Medicine, the Second Hospital of Hebei Medical University, Shijiazhuang 050000, China

Corresponding author: Hao Guimin, Email: haoguimin@163.com, Tel: +86-13932158810

【Abstract】 Endometrial receptivity refers to a progesterone-mediated period in which the endometrial tissue undergoes cell proliferation and differentiation. It's crucial for the early stage of embryo implantation. Endocannabinoids system (ECS) participates in body's physiological metabolism, which has a wide distributing in central nervous system and plays an important role in regulating metabolism and reproduction. The dynamic changes of the main endocannabinoid-N-arachidonylethanolamine (AEA) are involved in the early embryonic development. In this review, we briefly give an overview of the relationship between endometrial receptivity and ECS, to explore the effect of ECS in endometrial receptivity and pregnancy.

【Key words】 Endocannabinoids system; Endometrial receptivity; Reproductive development; Endogenous cannabinoid receptors; Decidua

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胰岛素抵抗对卵母细胞质量影响的研究进展

杨奂奂 孙小燕 骆晓荣 马晓玲 张学红

兰州大学第一医院生殖医学专科医院, 甘肃省生殖医学与胚胎重点实验室 730000

通信作者: 张学红, Email: zhangxueh@lzu.edu.cn, 电话: +86-13893215266

【摘要】 卵母细胞质量对女性生殖功能至关重要, 胰岛素抵抗 (insulin resistance, IR) 是影响卵母细胞质量的关键因素之一。近年来, 国内外学者从不同角度、不同层面对 IR 影响卵母细胞质量的问题进行了一系列研究。本文就卵泡细胞包括卵母细胞、颗粒细胞、卵泡膜细胞的微观结构与功能变化, 卵巢局部的缺血缺氧性损伤, 以及机体其他各内分泌轴的网络联系等不同方面对 IR 影响卵母细胞质量的机制进行了综述; 同时展望了未来需给予更多关注的研究方向, 以期进一步探究二者的相互关系, 并为不同 IR 程度、不同人群卵母细胞质量异常的患者进行个体化治疗及管理方案提供新思路。

【关键词】 胰岛素抵抗; 卵母细胞; 卵泡; 缺血缺氧; 内分泌系统

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Research progress of the relationship between oocyte quality and insulin resistance

Yang Huanhuan, Sun Xiaoyan, Luo Xiaorong, Ma Xiaoling, Zhang Xuehong

The Reproductive Medicine Special Hospital of the First Hospital of Lanzhou University, Key Laboratory for Reproductive Medicine and Embryo, Lanzhou 730000, China

Corresponding author: Zhang Xuehong, Email: zhangxueh@lzu.edu.cn, Tel: +86-13893215266

【Abstract】 Oocyte quality is very important for female reproductive function, insulin resistance (IR) is one of crucial factors to oocyte quality. In recent years, domestic and overseas scholars, standing in different angles and different levels, have conducted a series of studies about the effects of IR on the quality of oocyte. This article reviewed mechanisms of IR affecting oocyte quality from different aspects, such as changes in the microstructure and function of follicle cells including oocyte, granulosa cells and theca cells, local hypoxic-ischemic injury of ovary, and network ties between other endocrine axes. At the same time, it summarized research directions what need more attention in the future, in order to further explore the relationship between IR and oocyte quality, and to provide new ideas for strategies of individualized treatment and management among different patients with oocyte abnormalities impacted by different IR levels.

【Key words】 Insulin resistance; Oocyte; Follicle; Hypoxic-ischemic injury; Endocrine system

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