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· 临床研究 ·

# 常染色体平衡易位携带者控制性促排卵周期 卵巢反应性分析

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**【摘要】目的** 探讨常染色体平衡易位及类型对胚胎植入前遗传学诊断(PGD)周期控制性促排卵(COS)中卵巢反应性的影响。**方法** 回顾性分析 379 对染色体平衡易位夫妇行 PGD 的 426 个 COS 周期, 其中男方正常女方为平衡易位携带者 182 个周期(研究组, A 组), 包括罗氏易位 44 个周期(A1 组), 相互易位 138 个周期(A2 组); 女方正常男方为平衡易位携带者 244 个周期(对照组, B 组), 包括罗氏易位 65 个周期(B1 组), 相互易位 179 个周期(B2 组)。比较各组间 COS 中女方卵巢反应性指标。**结果** 研究组与对照组间年龄、体质指数(BMI)、基础内分泌(FSH、E<sub>2</sub>、LH)、窦卵泡数(AFC)、促性腺激素(Gn)用量和使用时间、第 2 日和第 3 日胚胎数、囊胚数、卵子成熟率、囊胚形成率等均无统计学差异( $P>0.05$ ); A 组 hCG 注射日 E<sub>2</sub> 水平、正常信号囊胚数[(5 469.8 ± 2 365.1) ng/L, 1.4 ± 1.4]均显著低于 B 组[(6 033.3 ± 2 587.5) ng/L, 1.8 ± 1.8] ( $P<0.05$ ), A 组取卵数、M<sub>II</sub> 卵子数、形成囊胚数均低于 B 组, 但是无统计学差异( $P>0.05$ ); A1 组 hCG 注射日 E<sub>2</sub> 水平、正常信号囊胚数[(5 573.2 ± 2 146.1) ng/L, 1.5 ± 1.5]显著低于 B1 组[(6 565.0 ± 2 961.1) ng/L, 2.8 ± 2.2] ( $P<0.05$ ); A2 组取卵数(14.6 ± 6.6)显著低于 B2 组(16.5 ± 6.7) ( $P<0.05$ )。**结论** ① 女方常染色体平衡易位可能影响 COS 中卵巢反应性; ② 女方罗氏易位形成平衡或正常胚胎几率低于男方罗氏易位者。

**【关键词】** 染色体平衡易位; 控制性促排卵(COS); 卵巢反应性; 胚胎植入前遗传学诊断(PGD)

**Analysis of ovarian response to controlled ovarian stimulation in autosomal balanced translocation carriers** Xing Jingjing, Su Yingchun, Zhang Qihua

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**【Abstract】 Objective** To investigate the effect of autosomal balanced translocation and types on ovarian response in preimplantation genetic diagnosis (PGD)-controlled ovarian stimulation (COS). **Methods** A retrospective analysis of 426 cycles of PGD for 379 couples with balanced translocations was performed, female translocation carriers were involved as the study group (group A), including 44 cycles of Robertson translocation (group A1) and 138 cycles of reciprocal translocations (group A2); male translocation carriers were involved as control group (group B), including 65 cycles of Robertson translocation (group B1) and 179 cycles of reciprocal translocations (group B2). The COS parameters were compared between these groups. **Results** The age, body mass index (BMI), basal endocrine (FSH, E<sub>2</sub>, LH), antral follicle count (AFC), gonadotropin (Gn) dosage and duration, day 2 (D2) and D3 embryo number, number of blastocysts, egg maturation rate and blastocyst formation rate were not significantly different ( $P>0.05$ ). In group A, the E<sub>2</sub> level on the day of hCG administration [ $(5\ 469.8 \pm 2\ 365.1)$  ng/L] and the number of oocytes retrieved ( $1.4 \pm 1.4$ ) were significantly lower than those of group B [ $(6\ 033.3 \pm 2\ 587.5)$  ng/L,  $1.8 \pm 1.8$ ] ( $P<0.05$ ). The E<sub>2</sub> level on the day of hCG administration and the number of normal blastocysts in group A1 [ $(5\ 573.2 \pm 2\ 146.1)$  ng/L,  $1.5 \pm 1.5$ ] was lower than those of group B1 [ $(6\ 565.0 \pm 2\ 961.1)$  ng/L,  $2.8 \pm 2.2$ ] ( $P<0.05$ ). The number of oocytes retrieved in group A2 ( $14.6 \pm 6.6$ ) was lower than that of group B2 ( $16.5 \pm 6.7$ ) ( $P<0.05$ ). **Conclusions** 1) Autosomal translocations in female may affect the ovarian response in COS. 2) The rate of forming balanced or normal embryo is lower in female Robertson translocation carriers than males.

**【Key words】** Chromosome balance translocation; Controlled ovarian stimulation (COS); Ovarian response; Preimplantation genetic diagnosis (PGD)

· 临床研究 ·

# 体外受精超促排卵治疗中单用促性腺激素和拮抗剂方案临床结局的比较

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**【摘要】目的** 探讨体外受精(IVF)治疗中单用促性腺激素(Gn)对妊娠结局的影响。**方法** 月经第3日开始给予重组卵泡刺激素(rFSH)促排卵, 促排卵第6日开始监测血激素水平和阴道超声监测卵泡大小。将达到思则凯添加标准者[黄体生成素(LH) $>5$  IU/L, 或 LH/基础 LH  $\geq 3$ ]设为对照组, 每日给予思则凯 0.125 mg 直至人绒毛膜促性腺激素(hCG)注射日; 以未达到标准不使用思则凯者设为研究组。**结果** 研究组( $n=31$ )和对照组( $n=49$ )患者在 Gn 剂量、促排卵天数、hCG 注射日血清内分泌水平、获卵数、受精率、着床率、临床妊娠率和活产率方面均无统计学差异( $P>0.05$ )。**结论** 在 IVF 促排卵治疗中, 通过对血清 LH 的监测, 如果 LH 维持在低水平可以不予拮抗剂治疗, 单纯使用 Gn 是一种经济有效的促排卵方案。

**【关键词】** 不孕; 促排卵; 拮抗剂

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· 临床研究 ·

**Comparison of clinical outcomes in *in vitro* fertilization (IVF) cycles with gonadotrophin alone or in association with GnRH antagonist** Fang Lu, Bian Jiang, Zheng Yanwei, Tao Minfang

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**【Abstract】 Objective** To analyze the clinical outcomes in *in vitro* (IVF) cycles with gonadotrophin alone. **Methods** Women undergoing their first IVF/ intracytoplasmic sperm injection (ICSI) cycles with gonadotropin (Gn) alone or in association with Gn antagonist were enrolled in this study. Ovarian hyperstimulation was starting on menstrual day 3 with recombination follicle stimulating hormone (rFSH). Serial vaginal ultrasound examination was performed and hormone levels were measured every other day from stimulation day 6. The patients with luteinizing hormone (LH)  $\leq 5$  IU/L, or LH/basal LH ratio  $< 3$  received Gn alone as study group. For the patients with LH  $> 5$  IU/L, or LH/basal LH ratio  $\geq 3$ , 0.125 mg Centrotide was administered daily till human chorionic gonadotrophin (hCG) injection day, namely control group. **Results** Totally 80 patients were enrolled, including 31 patients in study group, and 49 patients in control group. There were no statistically differences between the two groups in clinical pregnancy rate and live birth rate ( $P > 0.05$ ). The duration of stimulation, FSH dosage, the hormone levels on hCG injection day were also comparable. **Conclusion** Omitting administration of GnRH antagonist might be a cost-effective measure for patients without elevated LH during controlled ovarian hyperstimulation (COH).

**【Key words】** Infertility; Ovarian stimulation; GnRH antagonist

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# 卵巢正常反应不孕症患者体外受精不同 长方案促排卵效果的研究

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**【摘要】目的** 探讨卵巢正常反应不孕症患者体外受精/卵胞质内单精子显微注射(IVF/ICSI)促排卵时应用口服避孕药(OC)长方案和黄体中期长方案的促排卵效果及临床结局。**方法** 选择接受长方案 IVF/ICSI 助孕的卵巢正常反应患者共 4 677 个周期;根据年龄分为≤35 岁组和>35 岁组,不方便超声监测排卵或自然周期超声监测卵泡不破裂的患者共 2 762 个周期,应用 OC 长方案(OC 组);自然周期超声监测正常排卵的患者共 1 915 个周期,应用黄体中期长方案(黄体中期组);常规行 IVF/ICSI,比较上述不同年龄人群 2 种促排卵方案的临床和实验室相关指标。**结果** ① OC 组促性腺激素(Gn)启动日雌二醇(E<sub>2</sub>) [≤35 岁组: (24.63 ± 10.62) ng/L, >35 岁组: (24.24 ± 10.40) ng/L] 和促黄体生成素(LH)水平 [≤35 岁组: (0.92 ± 0.59) IU/L, >35 岁组: (0.82 ± 0.66) IU/L] 均明显低于黄体中期组 [≤35 岁组: (25.89 ± 12.80) ng/L, >35 岁组: (25.71 ± 10.93) ng/L; ≤35 岁组: (1.37 ± 0.59) IU/L, >35 岁组: (1.01 ± 0.70) IU/L] ( $P < 0.05$ ); ② OC 组人绒毛膜促性腺激素(hCG)注射日 E<sub>2</sub> 水平 [≤35 岁组: (4 143.8 ± 2 769.9) ng/L, >35 岁组: (3 597.5 ± 2 160.4) ng/L] 和因卵巢过度刺激综合征(OHSS)行全胚冷冻率 (≤35 岁组: 9.1%, >35 岁组: 10.2%) 均明显高于黄体中期组 [≤35 岁组: (3 850.8 ± 2 092.4) ng/L, >35 岁组: (3 213.4 ± 1 804.5) ng/L; ≤35 岁组: 4.9%, >35 岁组: 5.9%] ( $P < 0.05$ ), 但 hCG 注射日的内膜厚度 [≤35 岁组: (10.75 ± 2.25) mm, >35 岁组: (10.47 ± 2.38) mm] 却明显小于后者 [≤35 岁组: (11.62 ± 2.43) mm, >35 岁组: (11.09 ± 2.68) mm] ( $P < 0.05$ ); ③ 在年龄>35 岁的 OC 组 Gn 总用量 [(3 775.4 ± 1 200.0) IU] 和使用时间 [(13.5 ± 2.2) d] 明显高于黄体中期组 [(3 516.9 ± 1 156.1) IU, (12.4 ± 2.2) d] ( $P < 0.05$ ); ④ 2 种降调节方案患者的获卵数、ICSI 成熟卵数、双原核(2PN)受精率、平均移植胚胎数、优质胚胎率和早期流产率均无明显差异 ( $P > 0.05$ ), 但 OC 组的着床率 (≤35 岁组: 41.4%, >35 岁组: 25.5%) 和临床妊娠率 (≤35 岁组: 55.7%, >35 岁组: 37.5%) 明显小于黄体中期组 (≤35 岁组: 46.7%, >35 岁组: 31.4%; ≤35 岁组: 65.6%, >35 岁组: 46.9%) ( $P < 0.05$ )。**结论** ① OC 长方案可加深垂体抑制, 尤其是>35 岁的高龄患者需增加 Gn 用量才能达到与黄体中期长方案相似的促排卵效果; ② OC 长方案可能通过影响子宫内膜厚度及容受性而降低着床率和临床妊娠率; ③ OC 长方案使 hCG 注射日 E<sub>2</sub> 水平更高, 易诱发 OHSS 的发生。故对卵巢功能正常的不孕患者, IVF/ICSI 助孕时尽量选择黄体中期长方案。

**【关键词】** 体外受精/卵胞质内单精子显微注射-胚胎移植(IVF/ICSI-ET); 口服避孕药(OC)长方案; 黄体中期长方案

· 临床研究 ·

**A comparative study between oral contraceptive long protocol and mid-luteal long protocol in infertility patients with normal ovarian function in *in vitro* fertilization/intracytoplasmic sperm injection cycles**

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**【Abstract】 Objective** To explore the effect of oral contraceptive (OC) long protocol and mid-luteal long protocol on ovarian stimulation and clinical outcomes in infertility patients with normal ovarian function in *in vitro* fertilization/intracytoplasmic sperm injection (IVF/ICSI) cycles. **Methods** The data of 4 677 IVF/ICSI cycles of infertility patients with normal ovarian function were analyzed. Adjusted by age  $\leq 35$  years group and  $>35$  years group, the patients who had no ovarian detection or had no spontaneous ovulation received OC long protocol (2 762 cycles, OC group), and the patients who had spontaneous ovulation received the mid-luteal long protocol (1 915 cycles, mid-luteal group). The clinical and laboratory related indicators of different age group were compared between the two ovarian stimulating protocols. **Results** 1) The levels of estradiol ( $E_2$ ) [ $\leq 35$  years group:  $(24.63 \pm 10.62)$  ng/L,  $>35$  years group:  $(24.24 \pm 10.40)$  ng/L] and luteinizing hormone (LH) [ $\leq 35$  years group:  $(0.92 \pm 0.59)$  IU/L,  $>35$  years group:  $(0.82 \pm 0.66)$  IU/L] on gonadotropin (Gn) starting day in the OC group were less than those in the mid-luteal group [ $\leq 35$  years group:  $(25.89 \pm 12.80)$  ng/L,  $>35$  years group:  $(25.71 \pm 10.93)$  ng/L;  $\leq 35$  years group:  $(1.37 \pm 0.59)$  IU/L,  $>35$  years group:  $(1.01 \pm 0.70)$  IU/L] ( $P < 0.05$ ). 2) The levels of  $E_2$  on human chorionic gonadotropin (hCG) injection day [ $\leq 35$  years group:  $(4 143.8 \pm 2 769.9)$  ng/L,  $>35$  years group:  $(3 597.5 \pm 2 160.4)$  ng/L] and embryo frozen rate as result from OHSS ( $\leq 35$  years group: 9.1%,  $>35$  years group: 10.2%) in the OC group were higher than those in the mid-luteal group [ $\leq 35$  years group:  $(3 850.8 \pm 2 092.4)$  ng/L,  $>35$  years group:  $(3 213.4 \pm 1 804.5)$  ng/L;  $\leq 35$  years group: 4.9%,  $>35$  years group: 5.9%] ( $P < 0.05$ ). However, endometrial thickness on hCG injection day [ $\leq 35$  years group:  $(10.75 \pm 2.25)$  mm,  $>35$  years group:  $(10.47 \pm 2.38)$  mm] in the OC group was less than that in the mid-luteal group [ $\leq 35$  years group:  $(11.62 \pm 2.43)$  mm,  $>35$  years group:  $(11.09 \pm 2.68)$  mm] ( $P < 0.05$ ). 3) Gn used dosage [ $(3 775.4 \pm 1 200.0)$  IU] and duration [ $(13.5 \pm 2.2)$  d] in the OC group ( $>35$  years group) were higher than those in the mid-luteal group [ $(3 516.9 \pm 1 156.1)$  IU,  $(12.4 \pm 2.2)$  d] ( $P < 0.05$ ). 4) Number of retrieved oocytes, number of maturation oocytes in ICSI cycles, two pronucleus (2PN) rate, number of embryo transferred, top-quality embryo rate, and early miscarriage rate had no significant differences between the two long protocols. However, the implantation rate ( $\leq 35$  years group: 41.4%,  $>35$  years group: 25.5%) and clinical pregnancy rate ( $\leq 35$  years group: 55.7%,  $>35$  years group: 37.5%) in the OC group were less than those in the mid-luteal group ( $\leq 35$  years group: 46.7%,  $>35$  years group: 31.4%;  $\leq 35$  years group: 65.6%,  $>35$  years group: 46.9%) ( $P < 0.05$ ). **Conclusions** 1) Infertility patients with normal ovarian function underwent OC long protocol might lead to over pituitary suppression. Especially, patients aged  $>35$  years old who underwent OC long protocol should be increased dosage and duration of Gn therapy to achieve similar ovarian stimulation of the mid-luteal long protocol. 2) Infertility patients with normal ovarian function underwent OC long protocol received less implantation rate and clinical pregnancy rate that are relevant to endometrial thickness and endometrial receptivity. 3) The higher level of  $E_2$  on hCG injection day, the higher embryo frozen rate of OHSS. Therefore, infertility patients with normal ovarian function choose the mid-luteal long protocol as far as possible, and avoid using OC.

**【Key words】** *In vitro* fertilization/intracytoplasmic sperm injection (IVF/ICSI); Oral contraceptive (OC) long protocol; Mid-luteal long protocol



· 临床研究 ·

## 多囊卵巢综合征患者外周血 Ang-(1-7)、Ang II / Ang-(1-7)比值与胰岛素抵抗及脂代谢的相关性研究

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**【摘要】目的** 探讨多囊卵巢综合征(PCOS)患者中肾素血管紧张素系统(renin angiotensin system, RAS)与胰岛素抵抗(IR)及脂代谢的关系。**方法** PCOS 患者根据胰岛素抵抗指数(HOMA-IR)分为 IR 组( $HOMA-IR \geq 2.69$ ,  $n=80$ )与非 IR 组(NIR 组,  $HOMA-IR < 2.69$ ,  $n=67$ ), 另以 25 例正常月经周期女性作为对照组。采用酶联免疫法(ELISA)测定外周血管紧张素 II (Ang II)、血管紧张素 1-7[Ang-(1-7)]的水平, 化学发光法测定血清性激素、空腹胰岛素(FINS)、血脂水平。**结果** ① IR 组与 NIR 组外周血中 Ang II 和 Ang-(1-7)水平均高于对照组( $P < 0.05$ ), IR 组与 NIR 组间 Ang II 水平无统计学差异( $P > 0.05$ ), 但 Ang-(1-7)水平 IR 组低于 NIR 组( $P < 0.05$ ); ② IR 组外周血中 Ang II / Ang-(1-7)比值高于 NIR 组及对照组( $P < 0.05$ ), NIR 组 Ang II / Ang-(1-7)比值较对照组无统计学差异( $P > 0.05$ ); ③ Pearson 相关分析显示, IR 组外周血中 Ang-(1-7)与 FINS、HOMA-IR、体质量指数(BMI)呈负相关, 与卵泡刺激素(FSH)呈正相关( $P < 0.05$ ); NIR 组外周血中 Ang-(1-7)与甘油三酯(TG)呈负相关, 与高密度脂蛋白(HDL)呈正相关( $P < 0.05$ )。**结论** PCOS 患者外周血存在 Ang II、Ang-(1-7)亢进现象; Ang II / Ang-(1-7)比值失衡与 PCOS 患者的 IR 及代谢紊乱有关, Ang-(1-7)水平的提高可能改善 IR 及代谢紊乱。

**【关键词】** 多囊卵巢综合征(PCOS); 血管紧张素 II (Ang II); 血管紧张素 1-7[Ang-(1-7)]; 胰岛素抵抗(IR); 肥胖

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· 临床研究 ·

**Correlation among Ang-(1-7), Ang II /Ang-(1-7), insulin resistance and lipid metabolism in peripheral blood of polycystic ovary syndrome patients**

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**【Abstract】Objective** To investigate the correlation among renin angiotensin system (RAS), insulin resistance (IR) and lipid metabolism in polycystic ovary syndrome (PCOS) patients. **Methods** According to homeostasis model assessment (HOMA)-IR, PCOS patients were divided into IR group ( $\text{HOMA-IR} \geq 2.69$ ,  $n=80$ ) and non-IR (NIR) group ( $\text{HOMA-IR} < 2.69$ ,  $n=67$ ), 25 women with normal menstrual cycle were selected as the control. The levels of plasma Ang II and Ang-(1-7) were examined by enzyme-linked immunosorbent assay (ELISA); serum sexual hormone, fasting insulin (FINS), serum glucose and lipid were examined by chemiluminescence method. **Results** 1) The levels of Ang II and Ang-(1-7) in IR and NIR group were all higher than those in the control ( $P < 0.05$ ). The level of Ang II in IR group was not significantly different from NIR group ( $P > 0.05$ ), but the level of Ang-(1-7) was lower in IR group than in NIR group ( $P < 0.05$ ). 2) The Ang II /Ang-(1-7) ratio was higher in IR group than in other two groups ( $P < 0.05$ ). No statistical differences were found between NIR group and control group ( $P > 0.05$ ). 3) Pearson correlation analysis showed that Ang-(1-7) was negatively correlated with FINS, HOMA-IR, and body mass index (BMI) in IR group, and showed a positive correlation with follicle stimulating hormone (FSH) ( $P < 0.05$ ); Ang-(1-7) in NIR group was negatively correlated with triglyceride (TG), and had a positive correlation with high density lipoprotein (HDL) ( $P < 0.05$ ). **Conclusion** A hyperthyroidism phenomenon of Ang II and Ang-(1-7) levels exists in PCOS women as compared with the control. The imbalance of Ang II / Ang-(1-7) is associated with IR and metabolic disorders in PCOS patients. IR and metabolic disorders may be improved by improving Ang-(1-7) level.

**【Key words】** Polycystic ovary syndrome (PCOS); Angiotensin II (Ang II); Angiotensin 1-7 [Ang-(1-7)]; Insulin resistance (IR); Obesity

**Fund program:** Key Research and Development Projects in Hebei Province (16277723D)

· 临床研究 ·

# 四种方案治疗不明原因复发性流产的临床疗效分析

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**【摘要】目的** 探讨淋巴细胞免疫治疗(lymphocyte immunotherapy, LIT)联合阿司匹林和/或注射用人绒毛膜促性腺激素(human chorionic gonadotropin, hCG)治疗不明原因复发性流产(unexplained recurrent spontaneous abortion, URSA)的临床疗效及安全性。**方法** 回顾性分析 2009 年 1 月 1 日—2014 年 12 月 31 日就诊、病历资料完整且 LIT 结束后 1 年内妊娠的 URSA 患者的临床资料,比较单纯 LIT(A 组,  $n=61$ )、LIT 联合阿司匹林(B 组,  $n=109$ )、LIT 联合 hCG(C 组,  $n=35$ )、LIT 联合 hCG 及阿司匹林(D 组,  $n=65$ )的妊娠成功率、活产率,分析妊娠结局的影响因素,并监测孕期并发症及随访出生儿情况。**结果** 妊娠成功率 B 组为 75.2%、C 组为 82.9%、D 组为 83.1% 均显著高于 A 组(59.0%,  $P<0.05$ ),活产率 B 组为 71.6%、C 组为 82.9%、D 组为 80.0%,均显著高于 A 组(55.7%,  $P<0.05$ ),B 组、C 组、D 组的妊娠成功率及活产率组间无统计学差异( $P>0.05$ ),但 D 组发生孕期并发症的风险(7.69%)相对增加(A~C 组分别为 0.00%、0.92%、0.00%)。**结论** LIT 联合阿司匹林、LIT 联合 hCG、LIT 联合 hCG 及阿司匹林较单纯 LIT 治疗 URSA 可明显提高妊娠成功率及活产率,联合治疗值得在临床上应用及推广,但 LIT 联合 hCG 及阿司匹林的孕期安全性需进一步评估。

**【关键词】** 不明原因复发性流产(URSA); 淋巴细胞免疫治疗; 阿司匹林; 人绒毛膜促性腺激素(hCG); 联合治疗

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· 临床研究 ·

**Clinical analysis of four therapies of unexplained spontaneous abortion** Li Li, Wang Haiyan, Liu Ping,

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**【Abstract】 Objective** To evaluate the efficacy and safety of lymphocyte immunotherapy (LIT) with aspirin, LIT with human chorionic gonadotropin (hCG), LIT with joint hCG and aspirin, and LIT alone for patients with unexplained recurrent spontaneous abortion (URSA). **Methods** This retrospective cohort study included all consecutive patients with URSA in 2009—2014 in a tertiary care hospital. Patients were excluded if they had not become pregnant within 1 year after the end of LIT or their medical records were not complete. The rates of successful pregnancy and live birth were determined between the alone LIT group (group A,  $n=61$ ), LIT with aspirin (group B,  $n=109$ ), LIT with hCG (group C,  $n=35$ ) and LIT with joint hCG and aspirin (group D,  $n=65$ ). The factors that influenced these pregnancy outcomes were identified by multiple Logistical regression analysis. The partum maternal and neonatal complications were recorded. **Results** Compared with group A (59.0%), group B (75.2%), group C (82.9%) and group D (83.1%) had significantly higher rates of successful pregnancy ( $P<0.05$ ). Compared with group A (55.7%), group B (71.6%), group C (82.9%) and group D (80.0%) had significantly higher rates of live birth ( $P<0.05$ ). There was no statistical significance of the successful pregnancy rate and live birth rate among group B, group C and group D. The risk of maternal complications in group D (7.69%) relatively increased (0.00%, 0.92%, 0.00% in groups A–C, respectively). **Conclusion** LIT with aspirin, LIT with hCG, LIT with joint hCG and aspirin improved the pregnancy outcomes of patients with URSA, which deserved more clinical recognition and application. The future study to evaluate the safety of LIT with joint hCG and aspirin is warranted.

**【Key words】** Unexplained recurrent spontaneous abortion (URSA); Lymphocyte immunotherapy; Aspirin; Human chorionic gonadotropin (hCG); Combined therapy

**Fund program:** National Natural Science Foundation of China (30671971)

· 临床研究 ·

# 不明原因早期复发性流产患者蜕膜自然杀伤细胞对滋养层细胞系侵袭功能的影响

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**【摘要】目的** 研究早孕期复发性流产(RSA)患者与正常早孕妇女的蜕膜自然杀伤细胞(dNK)对滋养层细胞系 HTR-8/SVneo 侵袭能力的影响。**方法** 收集正常早孕人工流产妇女(正常早孕组,  $n=10$ )和不明原因 RSA 患者(RSA 组,  $n=8$ )的早孕蜕膜组织, 用密度梯度离心法分离出蜕膜淋巴细胞, 免疫磁珠法进一步分选出 CD56<sup>+</sup>CD16<sup>-</sup>NK 细胞, 即蜕膜 NK 细胞, 将蜕膜 NK 细胞与 HTR-8/SVneo 共培养 24 h 后, 通过 MTT 法和 Transwell 侵袭实验检测蜕膜 NK 细胞对滋养层细胞系 HTR8/SVneo 黏附及侵袭能力的影响, 用 Real-time PCR 检测共培养后 HTR-8/SVneo 细胞的 MMP-2 和 MMP-9 mRNA 水平的表达情况。**结果** 与正常早孕妇女相比, 不明原因早孕期 RSA 患者的蜕膜 NK 细胞对滋养层细胞系 HTR8/SVneo 侵袭能力有减弱作用, 并使 HTR-8/SVneo 表达促侵袭分子 MMP-2 和 MMP-9 表达降低。**结论** 妊娠早期局部母-胎界面 dNK 细胞的功能异常可能是导致不明原因 RSA 的一个原因。

**【关键词】** 蜕膜自然杀伤细胞(dNK); 复发性流产(RSA); 滋养层细胞; 侵袭

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· 临床研究 ·

**Impact of decidual natural killer (NK) cells of unexplained recurrent spontaneous abortion in pro-invasion capability of HTR-8/SVneo** Guo Wenwei, Li Bo, Xiao Xifeng, Chen Shuqiang, Wang Jun, Chen Lihua, Wang Xiaohong

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**【Abstract】 Objective** To investigate the impact of decidual natural killer (dNK) cells in pro-invasion capability of HTR-8/SVneo between recurrent spontaneous abortion (RSA) and normal pregnancy female. **Methods** Decidual lymphocytes from early pregnancy decidua tissue of RSA and normal pregnancy female were obtained by the density gradient centrifugation, furthermore, immunomagnetic beads were used to separate CD56<sup>+</sup>CD16<sup>-</sup>NK cells. In addition, the adhesion and pro-invasion capability of HTR-8/SVneo were evaluated by MTT and Transwell respectively after co-culture dNK cells and HTR-8/SVneo for 24 h. Real-time PCR was used to assess the expression of *MMP-2* and *MMP-9* mRNA in HTR-8/SVneo. **Results** dNK cells from RSA weaken the pro-invasion capability of HTR-8/SVneo, accompanying by down-regulating the expression of *MMP-2* and *MMP-9*. **Conclusion** Dysfunction of dNK cells in fetal-maternal interface may lead to RSA.

**【Key words】** Decidual natural killer (dNK); Recurrent spontaneous abortion (RSA); Trophoblast cell; Invasion

**Fund program:** Surface of National Natural Science Foundation of China (81370710, 81571531)

· 临床研究 ·

# 腹腔镜保守性手术联合药物治疗中、重度子宫内膜异位症及地诺孕素治疗复发性子宫内膜异位症性盆腔痛的疗效分析

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**【摘要】目的** 探讨腹腔镜保守性手术联合常用药物对中、重度子宫内膜异位症(EMS)的治疗效果, 以及新型药物地诺孕素对复发性子宫内膜异位症性盆腔痛(EAPP)的有效性及安全性。**方法** 对 2007 年 1 月—2014 年 1 月行腹腔镜保守性手术治疗 EMS 的 432 例患者进行回顾性分析与随访, 按照术后联合应用不同药物分为 A 组(单纯行腹腔镜保守性手术组)、B 组(术后联合应用 GnRH-a 类药物组), C 组[术后联合应用左炔诺孕酮宫内缓释系统(IUS-LNG)组], D 组(术后联合应用孕三烯酮组)。14 名 EAPP 复发患者每日口服地诺孕素 2 mg 治疗 6~13 个周期。分析各组患者 EAPP 的缓解情况、EMS 合并不孕患者的妊娠率与妊娠时间、EMS 的复发率与复发时间; 评估 EAPP 复发患者应用地诺孕素治疗的有效性及安全性。**结果** ① 4 组 EAPP 患者治疗前后的中位视觉模拟评分(VAS)均得到明显改善; B 组、C 组患者的改善更为明显。② 4 组患者 EMS 术后复发率与复发时间比较无统计学差异。③ A 组、B 组、D 组合并不孕患者的术后妊娠率分别为 40.00%、65.21%、50.00%; B 组患者术后妊娠率更高。④ 应用地诺孕素治疗复发性 EAPP 的患者用药前后的 VAS 评分有统计学差异。**结论** ① 单纯行腹腔镜保守性手术与手术后联合应用药物均能改善 EAPP, 提高妊娠率。② 联合应用 GnRH-a 类药物与 IUS-LNG 后 EAPP 改善更明显, 联合应用 GnRH-a 类药物还可提高妊娠率, 且不延长术后妊娠时间。③ 联合药物治疗后复发率与平均复发时间较单纯行腹腔镜保守性手术相比并未降低。④ 地诺孕素有望成为复发性 EAPP 理想的治疗药物。

**【关键词】** 子宫内膜异位症(EMS); 子宫内膜异位症性盆腔痛(EAPP); 治疗; 地诺孕素

**Curative effect analysis of laparoscopic conservative surgery combined with drug in treatment of moderate/severe endometriosis and the therapeutic evaluation of dienogest for recurrent endometriosis-associated pelvic pain** Qi Wenbo, Zhang Mingle, Huang Xianghua

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**【Abstract】 Objective** To investigate the curative effect of laparoscopic conservative surgery combined with commonly used drugs in treatment of moderate and severe endometriosis (EMS), and the curative effect and security of dienogest in the treatment of recurrent endometriosis-associated pelvic pain (EAPP). **Methods** Totally 432 patients who had a laparoscopic conservative surgery in the treatment of EMS from January 2007 to January 2014 were analyzed retrospectively and follow-up visited. These patients were divided into 4 groups by different postoperative drugs: group A (laparoscopic conservative surgery alone), group B [laparoscopic conservative surgery combined with gonadotropin releasing hormone agonist (GnRH-a)], group C [laparoscopic conservative surgery combined with levonorgestrel releasing intrauterine system (IUS-LNG)] and group D (laparoscopic conservative surgery combined with gestrinone). Fifteen patients with recurrent EAPP used dienogest 2 mg daily for 6–13 cycles. The remission of EAPP in each group, the postoperative pregnancy rate/time of infertile EMS patients, and the recurrence rate/time of EMS were analyzed. The curative effect and security of dienogest in the treatment of EAPP was assessed. **Results** 1) The visual analogue score (VAS) of EAPP patients were improved significantly after treatment in each group, patients in group B and group C improved more. 2) The recurrence rate and recurrence time of EMS showed no statistical difference among four groups. 3) The pregnancy rate of infertile patients was 40.0% in group A, 65.21% in group B and 50.0% in group D; group B improved more. 4) The VAS scores of EAPP recurrence patients after treatment with dienogest showed statistical difference with before. **Conclusions** 1) Laparoscopic conservative surgery alone or laparoscopic conservative surgery combined with drug both could relieve EAPP and improve pregnancy rate. 2) Laparoscopic conservative surgery combined with GnRH-a or IUS-LNG could relieve EAPP more significantly. Laparoscopic conservative surgery combined with GnRH-a could improve the pregnancy rate, and do not prolong postoperative pregnancy time. 3) There were no statistical differences of the recurrence rate and postoperative recurrence time of EMS between laparoscopic conservative surgery alone and laparoscopic conservative surgery combined with drug. 4) Dienogest was expected to be an ideal drug in treatment of EAPP recurrence.

**【Key words】** Endometriosis (EMS); Endometriosis-associated pelvic pain (EAPP); Treatment; Dienogest



· 实验研究 ·

# 体外操作对人卵母细胞线粒体膜电位影响的研究

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**【摘要】**目的 比较体外不同操作对人卵母细胞线粒体膜电位的影响。方法 利用 JC-1 试剂盒检测人卵母细胞在体外成熟培养、玻璃化冷冻解冻、卵胞质内单精子注射(ICSI)前后的线粒体膜电位变化,从而得出体外不同操作对线粒体膜电位的影响及卵母细胞质量与线粒体膜电位的关系。结果 卵母细胞在体外正常培养成熟、成熟卵母细胞玻璃化冷冻解冻及卵母细胞显微操作过程中线粒体膜电位均无统计学变化( $P>0.05$ )。体外成熟培养失败及单精子注射后受精失败的卵母细胞线粒体膜电位有明显下降( $P<0.05$ )。结论 体外常规操作对卵母细胞线粒体膜电位并无显著影响,但是线粒体膜电位与卵母细胞质量有密切关系,可以作为检验卵母细胞质量的一个重要指标。

**【关键词】** 卵母细胞; 线粒体膜电位; 凋亡

**基金项目:** 山西省卫生计生委资助科研项目(2014064)

· 实验研究 ·

**Effect of *in vitro* manipulation on mitochondrial membrane potential of human oocytes** Bi Xingyu,

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**【Abstract】 Objective** To compare the effects of different operations on the mitochondrial membrane potential of oocytes *in vitro*. **Methods** The mitochondrial membrane potential of oocytes, treated by oocyte maturation *in vitro*, vitrification and intracytoplasmic sperm injection (ICSI), were detected by JC-1 kit. **Results** No significant changes were observed in the mitochondrial membrane potential during the oocytes maturation *in vitro*, vitrification of oocytes and the micromanipulation of oocytes. At the same time, there was a significant decrease in the mitochondrial membrane potential of oocytes after the failure of *in vitro* maturation, and the failure of fertilization after single sperm injection. **Conclusion** *In vitro* routine operation has no obvious effect on the mitochondrial membrane potential of oocyte, but there is a close relationship between mitochondrial membrane potential and oocyte quality. Therefore, mitochondrial membrane potential can be used as a new indicator to evaluate the quality and a supplement to the morphological evaluation.

**【Key words】** Oocyte; Mitochondrial membrane potential; Apoptosis

**Fund program:** Shanxi Provincial Health and Family Planning Commission (2014064)

· 实验研究 ·

# 低碘环境对子代大鼠血清及睾丸抗氧化能力的影响

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**【摘要】目的** 研究不同低碘含量饲料对 Wistar 子代雄鼠血清及睾丸抗氧化能力的影响。**方法** 对 SPF 级 Wistar 雌鼠长期喂饲碘含量分别为 20  $\mu\text{g}/\text{kg}$ (A 组)、50  $\mu\text{g}/\text{kg}$ (B 组)、300  $\mu\text{g}/\text{kg}$ (C 组)饲料, 检测“三代两窝”传代后子二代喂养 3 个月、6 个月、9 个月时雄鼠血清、睾丸组织超氧化物歧化酶(SOD)、谷胱甘肽过氧化物酶(GSH-Px)活性及丙二醛(MDA)的含量。**结果** 从亲代开始长期进食低碘饲料明显影响子二代雄鼠血清及睾丸抗氧化能力, 且饲料碘含量越低影响越明显。血清 SOD、睾丸组织 GSH-Px 受低碘影响最显著( $P<0.05$ )。进一步分析造成睾丸抗氧化能力降低的因素, 结果表明与低碘影响睾丸组织细胞线粒体 SOD 活性有关( $P<0.05$ )。**结论** 随低碘影响周期越长, 机体碘营养水平越差, 对子代抗氧化能力影响越明显, 说明碘缺乏干预应在早期进行, 也提示适时进行碘缺乏高危对象抗氧化能力检测可作为判断碘缺乏损伤的指标之一。

**【关键词】** 碘; 抗氧化能力; 遗传损伤

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· 实验研究 ·

**Effect of iodine deficiency on serum and testis antioxidant capacity of next generation rats** Wang Jie,

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**【Abstract】 Objective** To explore the effect of different low iodine content of feed on serum and testis antioxidant capacity of the next generation Wistar male rats. **Methods** SPF-level Wistar female rats were randomly separated into three different groups, and fed with different iodine content food, 20  $\mu\text{g}/\text{kg}$  (group A), 50  $\mu\text{g}/\text{kg}$  (group B) and 300  $\mu\text{g}/\text{kg}$  (group C) for a long period. Based on the “three generations of two nest” animal model establishment method, the second-generation rat iodine deficiency animal model was established. After 3, 6, 9 months of feeding low iodine food, superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) activity and malonic dialdehyde (MDA) content of serum and testis tissues were determined. **Results** The serum and testicular antioxidant capacity of young second-generation rats were influenced by long-term low iodine diet that started from parental generation. The lower the level of iodine content, the more obvious the impact was. When comparing the serum SOD and testis tissue GSH-Px, there was a significant difference between low iodine groups and normal control groups ( $P < 0.05$ ). There was a close connection between the decreasing antioxidant capacity of testis and mitochondrial SOD activity affected by low iodine after further analysis. **Conclusions** According to the results, the effect of antioxidant ability in next generation iodine deficiency rats becomes more obvious with the longer low-iodine feeding as well as the decreasing iodine level. It indicates that iodine deficiency disorders prevention must be started at early age. Also, the detection of antioxidant capacity of iodine deficiency among high-risk population could be used as one of the indicators of iodine deficiency injury.

**【Key words】** Iodine; Antioxidant capacity; Genetic damage

**Fund program:** National Natural Science Foundation of China (81160334); Lanzhou University Students Innovation and Entrepreneurship Project (201310730136)

· 临床报道 ·

## 子宫内膜、卵巢三维超声能量多普勒血流参数与体外受精 - 胚胎移植妊娠结局的相关性研究

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**【摘要】目的** 探讨子宫内膜、卵巢的三维超声能量多普勒血流参数在预测体外受精 - 胚胎移植(IVF-ET)妊娠结局方面的价值。**方法** 选择接受 IVF-ET 治疗的 69 例患者, 其中妊娠组 28 例, 未妊娠组 41 例, 分别比较妊娠组和非妊娠组的临床特征以及子宫内膜、卵巢的三维超声能量多普勒血流参数。**结果** ①妊娠组与非妊娠组患者的基本特征、基础卵泡刺激素(bFSH)、促排卵药物用量、黄体生成素(LH)峰日雌二醇(E<sub>2</sub>)值、平均移植胚胎数等指标, 差异均无统计学意义( $P>0.05$ )。②妊娠组与未妊娠组人绒毛膜促性腺激素(hCG)注射日子宫内膜厚度、内膜血管化指数(VI)、血流指数(FI)、血管化 - 血流指数(VFI)及卵巢体积、卵巢 FI 均无统计学差异( $P>0.05$ ), 卵巢 VI、VFI 组间有统计学差异( $P<0.05$ )。**结论** 子宫内膜厚度、卵巢体积、内膜 VI、FI、VFI 及卵巢 FI 不能作为预测 IVF-ET 妊娠结局的评价指标, 卵巢的三维能量参数 VI、VFI 对妊娠结局的预测有一定的参考价值。

**【关键词】** 三维超声能量多普勒参数; 子宫内膜; 卵巢; 妊娠结局

· 临床报道 ·

**Analysis on the correlation between the pregnancy outcome of *in vitro* fertilization and embryo transfer and the parameters of three-dimensional power Doppler ultrasound in endometrium and ovary**

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**【Abstract】Objective** To investigate the clinical value of the parameters of three-dimensional power Doppler ultrasound in endometrium and ovary in predicting the pregnancy outcome of *in vitro* fertilization and embryo transfer (IVF-ET). **Methods** Sixty-nine patients who undergoing IVF-ET were recruited and assigned into pregnancy group (28 cases) and non-pregnancy group (41 cases). All their clinical characteristics and the parameters of three-dimensional power Doppler ultrasound in endometrium and ovary were obtained and compared. **Results** 1) The demographic characteristics, basal follicle stimulating hormone (bFSH), ovarian stimulating drug doses, luteotropic hormone (LH) day estradiol levels and the number of implanted embryos showed no differences between the pregnancy and non-pregnancy groups ( $P>0.05$ ). 2) There were no significant differences between pregnancy and non-pregnancy groups in endometrial thickness, endometrial vascularity indices and ovarian volume, ovarian flow index (FI) ( $P>0.05$ ). There were statistically significant differences between pregnancy and non-pregnancy groups in ovarian vascularization index (VI) and vascularization flow index (VFI) ( $P<0.05$ ). **Conclusion** The endometrial thickness, endometrial vascularity indices and ovarian volume, ovarian FI cannot predict the pregnancy outcome. The ovarian VI, VFI are partially served to predict the pregnancy outcome.

**【Key words】** Parameters of three-dimensional power Doppler ultrasound; Endometrium; Ovary; Pregnancy outcome

· 临床报道 ·

## 体外受精 - 胚胎移植中注射人绒毛膜促性腺激素后 不同时间受精对早期胚胎发育及临床结局的影响

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**【摘要】目的** 探讨人绒毛膜促性腺激素(hCG)注射后不同时间受精对体外受精 - 胚胎移植(IVF-ET)治疗患者实验室指标及临床指标的影响。**方法** 选取行 IVF-ET 治疗并符合纳入标准的患者 200 例, 根据 hCG 注射后受精时间不同随机分为 4 组: hCG 注射后 38.0~39.0 h 受精为 A 组; 注射 hCG 后 39.1~40.0 h 受精为 B 组、hCG 注射后 40.1~41.0 h 受精为 C 组、hCG 注射后 41.1~42.0 h 受精为 D 组, 每组 50 例, 观察并比较四组间实验室指标及临床指标。**结果** 可用胚胎率 B 组(65.7%)、C 组(63.3%)、D 组(66.8%)均高于 A 组(55.5%) ( $P<0.05$ ); 优质胚胎率 A 组(50.6%)显著低于 C 组(60.2%)与 D 组(63.6%) ( $P<0.05$ ), B 组(54.3%)明显低于 D 组 ( $P<0.05$ ); C 组获得了较好的临床结局, 临床妊娠率(50.0%)和着床率(34.2%)较高, 流产率(9.1%)较低。正常受精率、正常卵裂率、临床妊娠率、着床率以及流产率组间比较, 差异均无统计学意义 ( $P>0.05$ )。**结论** 在一定时间范围内(38.0~42.0 h), 随着 hCG 注射后受精时间的延长, 优质胚胎率呈增高趋势; 本中心 IVF-ET 治疗患者的最佳受精时间为 hCG 注射后 40.1~41.0 h, 此时受精患者有较高的临床妊娠率, 较低的早期流产率及较好的临床妊娠结局。

**【关键词】** 受精时间; 体外受精 - 胚胎移植 (IVF-ET); 人绒毛膜促性腺激素 (hCG); 临床妊娠率

**Effect of the different fertilization time after human chorionic gonadotropin injection on the early embryonic development and clinical outcome of patients in *in vitro* fertilization-embryo transfer**

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**【Abstract】 Objective** To investigate the effect of the different fertilization time after human chorionic gonadotropin (hCG) injection on the early embryonic development and clinical outcome of patients during *in vitro* fertilization-embryo transfer (IVF-ET). **Methods** A total of 200 patients undergoing IVF-ET were divided into 4 groups according to the different fertilization time after hCG injection. Group A: fertilization happened in 38.0–39.0 h after hCG injection, group B: 39.1–40.0 h after hCG injection, group C: 40.1–41.0 h after hCG injection, group D: 41.1–42.0 h after hCG injection, 50 cases in each group. The normal fertilization rate, cleavage rate, the high quality embryo rate, the embryo utilization rate, the clinical pregnancy rate, the implantation rate, and the spontaneous abortion rate were evaluated among the 4 groups. **Results** The embryo utilization rate in group B (65.7%), group C (63.3%), group D (66.8%) was higher than that of group A (55.5%) ( $P < 0.05$ ). High-quality embryo rate in group A (50.6%) was lower than that of group C (60.2%) and group D (63.6%), while high-quality embryo rate in group B (54.3%) was lower than that in group D ( $P < 0.05$ ); if fertilization happened in 40.1–41.0 h (including 41 h) after hCG injection, clinical performance was the best [higher clinical pregnancy rate (50.0%) and implantation rate (34.2%) than others, lower abortion rate (9.1%) than others]. There were no obvious differences in the normal fertilization rate, the normal cleavage rate, the clinical pregnancy rate, the implantation rate and the abortion rate among the 4 groups ( $P > 0.05$ ). **Conclusion** The different fertilization time after hCG injection in IVF-ET have effects on high-quality embryo rate. During a certain time range (38–42 h), as the increase of delayed fertilization time after hCG injection, high-quality embryo rate is also increasing. The best fertilization time of patients in IVF-ET was 40.1–41.0 h after hCG injection in our reproductive center, which can improve the clinical pregnancy rate, reduce the early abortion rate and get better clinical pregnancy outcome.

**【Key words】** Fertilization time; *In vitro* fertilization-embryo transfer (IVF-ET); Human chorionic gonadotropin (hCG); Clinical pregnancy rate



· 个案报道 ·

## 经阴道超声引导下减胎术在输卵管间质部妊娠合并宫内孕中的应用——减胎成功 2 例报告

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**【摘要】目的** 探讨孕早期采用经阴道超声引导下减胎术减灭宫外孕胚芽的临床治疗效果。**方法** 通过阴道超声减胎抽吸宫外孕组织。**结果** 对 2 例诊断为未破裂输卵管间质部的早期异位活胎妊娠, 通过经阴道超声引导下减胎穿刺治疗, 被保留的宫内胎儿持续妊娠至足月分娩。**结论** 孕早期采用经阴道超声引导下减胎术选择性抽吸输卵管间质部胚芽, 可获得理想的临床治疗效果。但是本方法仅去除胚芽组织, 对残余的绒毛组织, 需密切追踪随访。

**【关键词】** 宫内外同时妊娠(HP); 输卵管间质部妊娠; 经阴道超声减胎术

· 个案报道 ·

**Successful management of transvaginal reduction in heterotopic interstitial tubal pregnancy: two cases report and literature review** Liu Wenxia, Liu Manman, Guan Yichuan, Wang Xingling

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**【Abstract】 Objective** To investigate the treatment of heterotopic pregnancy (HP) after *in vitro* fertilization and embryo transfer (IVF-ET), and to explore the effect of clinical treatment of transvaginal ultrasound-guided embryo aspiration at the early stage of pregnancy. **Methods** Two successful cases of heterotopic interstitial tubal pregnancy treated with transvaginal ultrasound-guided ectopic embryo aspiration in early pregnancy and relevant literature review were discussed. **Results** After the treatment of transvaginal ultrasound-guided embryo aspiration in the early diagnosed interstitial tubal pregnancy with cardiac activity, the retained intrauterine fetal continues to be pregnant and a healthy baby will be delivered at term. **Conclusion** Transvaginal ultrasound-guided embryo aspiration can be considered to be a management of heterotopic interstitial tubal pregnancy in the first trimester. However, the follow-up is important because of the potential in the growth of retained villi tissue.

**【Key words】** Heterotopic pregnancy (HP); Interstitial tubal pregnancy; Transvaginal ultrasound embryo aspiration

## 线粒体替代疗法的研究进展

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**【摘要】** 线粒体替代疗法的主要应用方向为阻断线粒体基因病的遗传和改善高龄妇女的卵母细胞质量。线粒体基因病是线粒体基因组发生基因突变所导致的一类疾病, 目前仍无治愈方法, 线粒体替代疗法通过对含有突变型线粒体的卵母细胞进行线粒体置换, 可阻断线粒体遗传病向子代传递。此外, 线粒体替代或补充能增加老化卵母细胞的能量供应, 有望用于改善高育龄妇女辅助生殖的临床结局。本文对线粒体替代疗法的研究进展及存在的问题进行综述。

**【关键词】** 卵母细胞; 线粒体; 线粒体替代疗法(MRT); 辅助生殖技术(ART)

· 综述 ·

**Research progress on mitochondrial replacement therapies** Li Han, Ji Yazhong

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**【Abstract】** Mitochondrial replacement therapy (MRT) is mainly used for eliminating transmission of mutant mitochondrial DNA (mtDNA) to offspring and improving the quality of oocytes of older women. MtDNA mutations are a relatively common cause of mitochondria disorders, there is currently no cure for these disorders. MRT is a process that the nuclear DNA is moved from oocyte or zygote with abnormal mtDNA then transferred into donor oocyte or zygote containing healthy mitochondria. MRT could prevent transmission of mtDNA disease to offspring. MRT can also increase mitochondrial function and energy supply in aged oocyte. It is suggested that mitochondrial transfers could have a positive impact on pregnancy outcome of assisted reproductive technology (ART) in older women. In this paper, the research progress and controversies of mitochondrial replacement therapies were reviewed.

**【Key words】** Oocyte; Mitochondria; Mitochondrial replacement therapy (MRT); Assisted reproductive technology (ART)

## miRNA 参与配子发生和早期胚胎发育调控的研究进展

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**【摘要】** MicroRNA(miRNA)是一类高度保守的小分子非编码 RNA(small non-coding RNA, sncRNA), 可以在转录后水平通过抑制 mRNA 的翻译、促进靶基因的降解等方式下调基因表达, 参与多种生命过程的调控。最近的研究表明, miRNA 在哺乳动物生殖细胞中也有表达, 在配子发生、胚胎发育等多种相关过程中发挥重要调控作用。本文主要就 miRNA 在哺乳动物配子发生和早期胚胎发育中的功能作一综述。

**【关键词】** 哺乳动物; miRNA; 配子; 胚胎发育

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**Regulatory role of microRNAs in mammalian gametogenesis and early embryonic development**

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**【Abstract】** MicroRNAs (miRNAs) are a recently discovered class of small non-coding RNAs which regulate gene expression post-transcriptionally through RNA interference. It has been shown that miRNAs participate in virtually almost all cellular processes including mammalian gametogenesis and embryonic development. Growing evidence supports the presence and regulation of a distinct set of reproductive-associated miRNAs, and their essential roles in regulating reproductive processes associated with normal and abnormal cell development. This review summarized recent advancements on functional profiles of miRNAs in mammalian gametogenesis and early embryonic development.

**【Key words】** Mammals; MicroRNAs (miRNAs); Gamete; Embryonic development

**Fund program:** National Key Basic Research Program of China 973 Program (2014CB943104); Research Project of Shanghai Health and Family Planning Commission (201640369)

· 综述 ·

## 阴道微生态变化与宫颈人乳头瘤病毒感染的相关性研究进展

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**【摘要】** 阴道微生态是一个独特、动态变化的灵敏体系, 易受内源性和外源性因素的影响, 由阴道微生物菌群、阴道解剖结构、局部免疫及机体的内分泌调节功能构成, 核心是微生物菌群, 优势菌是乳酸杆菌。研究认为阴道微生态的改变与人乳头瘤病毒(human papillomavirus, HPV)感染有一定的相关性, 本文就阴道微生态失衡导致常见阴道炎如需氧菌性阴道炎、细菌性阴道炎、滴虫性阴道炎、外阴阴道假丝酵母菌病与宫颈 HPV 感染相关性进行阐述。

**【关键词】** 阴道微生态; 人乳头瘤病毒; 乳酸杆菌

**Progress on the correlation between vaginal ecological alteration and cervical human papillomavirus infection** Tan Hongying, Ma Jianting

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**【Abstract】** Vaginal ecosystem is a unique, dynamic changes of sensitive system. It is easily affected by endogenous and exogenous factors. Also, vaginal microecology is consisted of vaginal microbiota, vaginal and its anatomical feature, local immunity as well as the host's endocrine condition. The core of ecosystem is vaginal microbiota which is dominated by *Lactobacillus* spp. Studies suggest that there is a certain relevance between changes in vaginal microbiota and human papilloma virus (HPV) infection. We reviewed the vaginal ecological imbalance leading to common vaginitis such as aerobic vaginitis, bacterial vaginitis, trichomonas vaginitis, vulvovaginal candidiasis and described their correlation with cervical HPV infection.

**【Key words】** Vaginal ecosystem; Human papilloma virus (HPV); *Lactobacillus*



## 母体叶酸水平与子代生长发育状况相关性的研究进展

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**【摘要】** 叶酸是一种重要的人体必需营养素。研究表明, 孕期补充叶酸可以预防多种出生缺陷的发生, 已有多个国家全面推行了叶酸强化政策。但有证据指出, 过量补充叶酸不仅无法预防疾病, 还会适得其反。目前研究聚焦在母体叶酸补充剂量与子代健康的相关性上, 特别是孕期过量补充叶酸是否会对子代造成副作用。本文拟从叶酸的代谢、人群叶酸营养水平、临床常见的叶酸检测方法、应用以及母体叶酸摄入异常对后代生长发育的影响 4 个方面进行综述。

**【关键词】** 叶酸; 出生缺陷; 检测方法; 叶酸缺乏; 叶酸过量

**基金项目:** 国家重点研发计划(2016YFC1000503); 国家自然科学基金面上项(81272331)

**Advances in the correlation of maternal folic acid level and the growth and development of offspring**

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**【Abstract】** Folic acid, as one of the essential nutrients, plays a crucial role in human body. Recent researches showed that the supplementation of folic acid during pregnancy could prevent various birth defects, and many countries around the world having implemented policies of folic acid fortification. However, there are epidemiological evidences that excess folic acid supplement may not only fail to exert preventive effects on diseases, but may also be counter productive. Therefore, recent researches are focusing on the correlation of maternal folic acid level and the growth and development of offspring, in particular, whether the excess folic acid supplementation during pregnancy will cause detrimental side effects on offspring. In this article, the metabolism of folic acid, the crowd nutrient level of folic acid, the common detection methods used clinically and their application, and the effects of abnormal maternal intake of folic acid on the growth and development of offspring are reviewed.

**【Key words】** Folic acid; Birth defects; Detection methods; Folic acid deficiency; Folic acid excess

**Fund program:** Nation Key Research and Development Program (2016YFC1000503); National Natural Science Foundation of China (81272331)

## 肾脏肾素 - 血管紧张素系统与胎源性肾小球硬化

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**【摘要】** 肾脏肾素 - 血管紧张素系统(renin-angiotensin system, RAS)在肾小球硬化的发生发展中起到重要作用。近年来的研究表明, 胚胎肾脏发育不良能够增加成年后肾脏疾病的易感性, 且证实肾小球硬化可能具有宫内发育起源。相关研究也表明, 各种因素导致的孕期不良宫内环境会分别导致胚胎期、成年后 RAS 出现病理性改变, 进而导致胎儿肾脏发育不良、致成年后肾小球硬化易感。

**【关键词】** 肾脏肾素 - 血管紧张素系统(RAS); 胎源性肾小球硬化; 孕期不良环境

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· 综述 ·

**Renin-angiotensin system of kidney and fetal originated glomerulosclerosis** Wan Yang, Ao Ying,

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**【Abstract】** It is well known that renin-angiotensin system of kidney (RAS) plays a crucial role in the development of glomerulosclerosis. Many previous studies have suggested that fetal renal dysplasia might increase susceptibility to renal diseases in adult offspring, which indicates that glomerulosclerosis has the fetal origin. Related studies have shown that adverse prenatal environment resulting from various factors can lead to pathological changes of RAS in fetal and adult period respectively, leading to dysplasia of fetal kidney development and the susceptibility to glomerulosclerosis in the adult offspring.

**【Key words】** Renin-angiotensin system (RAS) of kidney; Fetal originated glomerulosclerosis; Adverse prenatal environment

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