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· 男性不育专栏 ·

我国人类精子库安全体系建设的思考

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【摘要】 人类精子库的安全体系直接关联精子库的运行正常性和授精项目的生殖安全性, 与子代的生殖健康和优生优育息息相关。我国人类精子库已正式运行 20 余年, 不可避免地暴露出一些安全问题或风险, 须予以重视和防范。本文阐述了我国人类精子库运行涉及管理安全、生殖安全和遗传安全等方面可能存在的安全问题或风险, 并就人类精子库安全体系建设的可能方向提出见解, 包括加强职能部门及医疗机构对人类精子库的支持及监管力度, 加快建设人类精子库质量管理体系, 促进人类精子库国内外学术交流, 推动信息化、人工智能及基因测序等新技术在人类精子库的应用等。重视人类精子库安全体系的建设, 防患于未然, 对实施高质量的男性生育力保存, 保障辅助生殖项目的生殖安全和生殖健康, 具有积极现实意义和深远社会影响。

【关键词】 人类精子库; 安全风险; 安全体系

Consideration in the construction of safety system for human sperm banks in China

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【Abstract】 The safety system of human sperm bank is not only directly associated with the working normality of the sperm bank and the reproductive safety of insemination project, but also deeply related to the reproductive health and eugenics of the offspring. Human sperm banks in China have been formally worked for over 20 years. However, some safety problems or risks in sperm banks have been

inevitably exposed during the working period. Thus, safety problems or risks of the sperm bank should be fully given attention. In this paper, potential safety problems or risks of the sperm bank were illustrated on aspects of management safety, reproductive safety, and genetic safety. In addition, views on the possible improvement of safety system were given including strengthening supervision for the sperm bank from governmental agencies, promoting academic exchange of sperm banks at home and abroad, and applying new gene sequencing techniques etc. Paying more attention on the construction of the safety system can prevent the potential safety problems or risks in sperm banks, promote high quality male fertility preservation and ensure both reproductive safety and health of assisted reproductive programs. It has positive practical significance and far-reaching social influence.

【Key words】 Human sperm bank; Safety risk; Safety system

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·男性不育专栏·

附睾 4-5 段 CD147 缺失对精子成熟的作用研究

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【摘要】 目的 研究小鼠附睾上皮表达的 CD147 对精子成熟的影响。方法 利用小鼠附睾 4-5 段主细胞特异表达的 Lcn5-Cre 小鼠和 CD147^{fllox/fllox} 繁育, 获得 24 只 CD147 在附睾 4-5 段特异敲除的小鼠(CD147 cKO-Lcn5)和 21 只 CD147^{fllox/fllox} 对照小鼠。通过计算机辅助精子活力检测(computer-aided sperm analysis, CASA)、A23187 诱导精子的顶体反应以及体外受精(*in vitro* fertilization, IVF)等方法评估 CD147 对小鼠精子功能的影响。结果 小鼠附睾头部 4-5 段敲除 CD147 后, 精子活力和顶体反应的差异均无统计学意义(均 $P>0.05$)。IVF 实验结果显示, CD147 cKO-Lcn5 小鼠 2-细胞率($74.03\%\pm 2.93\%$)相较于 CD147^{fllox/fllox} 小鼠($90.59\%\pm 2.39\%$)显著降低($P=0.012$)。结论 附睾头部 4-5 段敲除 CD147 后对精子活力和顶体反应无显著影响, IVF 后 2-细胞率显著被抑制。

【关键词】 精子成熟； 受精，体外； CD147； 附睾 4-5 区段
基金项目：国家重点研发计划子课题（2018YFC1003602）

Effects of CD147 deletion in segments 4-5 of epididymis on sperm maturation

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【 Abstract 】 Objective To investigate the potential role of CD147 expressed in the mouse epididymal epithelial cells on sperm maturation. **Methods** Lcn5-Cre mice which were specifically expressed in the principal cells in the segments 4-5 of mouse epididymis were bred with CD147^{fllox/fllox} to obtain 24 of the CD147 conditional knockout mice (CD147 cKO-Lcn5) and its counterpart CD147^{fllox/fllox} control mice. Computer-aided sperm analysis (CASA), A23187-induced sperm acrosome reaction, and *in vitro* fertilization (IVF) were used to evaluate the effects of CD147 on sperm functions. **Results** After CD147 knockout in the mice segment 4-5 of the caput epididymis, there were no statistically significant differences in sperm motility and acrosome reaction. Of note, the two-cell ratio of CD147 cKO-Lcn5 mice (74.03%±2.39%) was significantly reduced compared with that of CD147^{fllox/fllox} mice (90.59%±2.39%) in the experiment for IVF (*P*=0.012). **Conclusion** CD147 deleted in the 4-5 caput epididymis has limited regulatory effects on sperm motility and acrosome reaction processes, but significantly affected the ratio of two-cell after IVF.

【 Key words 】 Sperm maturation; Fertilization *in vitro*; CD147; Segment 4-5 of epididymis

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·男性不育专栏·

梗阻性无精子症患者 ICSI 助孕失败后精道显微重建术可行性与安全性分析——附 20 例报道

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董建军和赵晶鹏对本文有同等贡献

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【摘要】 目的 旨在探讨梗阻性无精子症（obstructive azoospermia, OA）患者卵胞质内单精子注射（intracytoplasmic sperm injection, ICSI）助孕失败后精道显微重建可行性和安全性。方法 回顾性分析 2015 年 9 月至 2020 年 5 月期间于上海交通大学医学院附属第一人民医院泌尿外科临床医学中心男科收治的 20 例既往 ICSI 助孕失败的 OA 患者资料，总结精道显微重建术特点，并计算其术后复通率与临床妊娠率。结果 显微镜下精道重建术中，8 例患者存在输精管梗阻，12 例患者存在附睾梗阻。输精管梗阻患者中，1 例为外伤性 OA，行腹腔镜辅助的右侧输精管吻合术（vasovasostomy, VV）；7 例为幼年斜疝术后 OA，其中 6 例进一步行腹腔镜辅助的 VV，1 例行输精管附睾交叉吻合术；8 例患者中 6 例术后复通，2 例术后女方自然妊娠。附睾梗阻患者均行显微镜下输精管附睾吻合术（vasoepididymostomy, VE），12 例患者中 6 例术后复通，3 例术后女方自然妊娠。所有患者术中、术后均未出现明显并发症。结论 输精管道显微重建手术是 OA 患者 ICSI 助孕失败后的一种有效的补救措施，可帮助患者实现自然妊娠。

【关键词】 不育，男性； 精子注射，细胞质内； 梗阻性无精子症； 显微精道重建术

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Feasibility and safety of microsurgical anastomosis for obstructive azoospermia patients with prior ICSI failure (20 cases)

Dong Jianjun^{1,2}, Zhao Jingpeng³, Yang Chao⁴, Yao Chencheng¹, Tian Ruhui¹, Zhi Erlei¹, Zhang Jianxiong¹, Li Zheng¹, Li Peng¹

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【 Abstract 】 Objective To analyze the feasibility and safety of microsurgical anastomosis for obstructive azoospermia (OA) patients with prior intracytoplasmic sperm injection (ICSI) failure. **Methods** From September 2015 to May 2020, the data of 20 OA patients with previous ICSI-assisted pregnancy failure admitted to the Department of Andrology, Urologic Medical Center, Shanghai General Hospital, Shanghai Jiao Tong University School of Medicine were retrospectively analyzed. The characteristics of seminal tract microsurgical reconstruction were summarized, and the postoperative recurrence rate and clinical pregnancy rate were calculated. **Results** Vasal obstruction was found in 8 patients and epididymal obstruction in 12 patients during microscopically reconstructed seminal tract. Among the patients with vasal obstruction, 1 patient developed OA after trauma and underwent laparoscopic-assisted right vasovasostomy (VV). Totally 7 patients developed OA after juvenile bilateral hernia, among whom 6 patients underwent further laparoscopic-assisted VV and 1 patient underwent vasovasostomy and epididymal cross anastomosis. Of the 8 patients who underwent VV, 6 achieved postoperative patency, and 2 couples achieved natural pregnancy. Patients with epididymal obstruction underwent microscopic vasoepididymostomy (VE), and 6 out of 12 patients achieved postoperative pregnancy, while 3 couples achieved natural pregnancy. No significant complications occurred in all patients during and after operation. **Conclusion** Microsurgical anastomosis is an effective remedy for patients with OA after ICSI pregnancy failure, which can help patients achieve natural pregnancy.

【 Key words 】 Infertility, male; Sperm injections, intracytoplasmic; Obstructive azoospermia; Microsurgical anastomosis

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·男性不育专栏·

AMH 在 NOA 患者显微取精术前评估中的应用

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【摘要】 目的 探讨血清抗苗勒管激素 (anti-Müllerian hormone, AMH) 测定在评估非梗阻性无精子症 (non-obstructive azoospermia, NOA) 患者显微取精成功率中的价值。方法 采用回顾性病例对照研究分析 2014 年 9 月至 2022 年 5 月期间于中山大学附属第六医院生殖医学中心接受显微取精手术的 502 例 NOA 患者的临床资料, 根据手术结果分为获精组和未获精组, 根据取精术中生精小管是否出现可辨别的差异分为差异可辨组和差异不可辨组, 比较各组年龄、睾丸体积、血清 AMH 以及卵泡刺激素 (follicle-stimulating hormone, FSH)、睾酮水平的差异, 根据 NOA 病因分为睾丸炎组 (特发性或腮腺炎继发)、AZFc 区基因缺失组、隐睾下降固定术后组、克氏综合征 (Klinefelter's syndrome, KS) 组、特发性 NOA 组, 比较不同病因 NOA 患者获精率 (sperm retrieval rate, SRR) 与 AMH 水平的差异。结果 270 例患者成功获取到精子, SRR 为 53.8%; 获精组 AMH 水平显著低于未获精组 [0.81 (0.16, 3.26) $\mu\text{g/L}$ 比 1.37 (0.21, 4.84) $\mu\text{g/L}$, $P<0.001$], 两组间年龄、睾丸体积、FSH、睾酮水平差异均无统计学意义 (均 $P>0.05$)。不同病因 NOA 的血清 AMH 水平差异有统计学意义 ($P<0.001$), 睾丸炎、AZFc 缺失、隐睾下降、KS 和特发性 NOA 的 AMH 水平分别为 0.15 (0.01, 0.41) $\mu\text{g/L}$ 、5.71 (3.57, 8.26) $\mu\text{g/L}$ 、2.29 (1.36, 3.81) $\mu\text{g/L}$ 、0.15 (0.05, 0.39) $\mu\text{g/L}$ 、2.46 (0.75, 5.49) $\mu\text{g/L}$ 。在特发性 NOA 患者中, 显微取精获精组的年龄高于未获精组 [(35.2 \pm 8.9) 岁比 (32.5 \pm 5.5) 岁, $P=0.010$], 睾酮、AMH 水平显著低于未获精组 [(3.1 \pm 1.4) $\mu\text{g/L}$ 比 (3.7 \pm 2.1) $\mu\text{g/L}$, $P=0.029$; 1.63 (0.35, 3.84) $\mu\text{g/L}$ 比 3.00 (1.20, 6.68) $\mu\text{g/L}$, $P=0.001$], 两组睾丸体积与 FSH 水平差异均无统计学意义 (均 $P>0.05$); AMH 水平对显微取精 SRR 的受试者工作特征 (receiver operating characteristic, ROC) 曲线分析, AMH 切点值为 2.96 $\mu\text{g/L}$ 、敏感度为 0.710、特异度为 0.523、曲线下面积 (area under the curve, AUC) 为 0.649。生精小管差异可辨组的 AMH 水平显著低于差异不可辨组 [0.55 (0.12, 2.05) $\mu\text{g/L}$ 比 2.99 (0.76, 6.11) $\mu\text{g/L}$, $P<0.001$], 而 SRR 高于差异不可辨组 [75.9% (236/311) 比 17.8% (34/191), $P<0.001$]。结论 对 NOA 患者实施显微取精时, 低 AMH 水平病例更易于观察到生精小管之间的差异, 并有更好的 SRR, 测定 AMH 的价值在特发性 NOA 患者中尤其明显。

【关键词】 抗苗勒管激素; 无精子症; 显微取精

Application of AMH in preoperative evaluation of micro-TESE in NOA patients

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【Abstract】 Objective To investigate the value of anti-Müllerian hormone (AMH) determination for estimating the sperm retrieval rate (SRR) of microdissection testicular sperm extraction (micro-TESE) in non-obstructive azoospermia (NOA) patients. **Methods** This was a retrospective case-control study. Totally 502 NOA patients treated with micro-TESE in Reproductive Medicine Research Centre, the Sixth Affiliated Hospital, Sun Yat-sen University from September 2014 to May 2022 were involved in the investigation. Patients were divided into different groups according to their surgery outcome and seminiferous tubules appearance. Age, testis volume, serum AMH, follicle-stimulating hormone (FSH), testosterone level were compared between the different groups. According to the cause of NOA, they were divided into orchitis group (idiopathic or parotid), AZFc gene deletion group, cryptorchidism descending fixation group, Klinefelter's syndrome (KS) group and idiopathic NOA group. The differences of SRR and AMH level in NOA patients with different etiologies were compared. **Results** Testicular sperms were successfully retrieved in 270 cases (SRR=53.8%). There were no statistical differences in age, testicular volume, FSH and testosterone levels between the patients who succeeded or failed to obtain sperm (all $P>0.05$). The patients who obtained sperms had lower serum AMH level than those without sperm [0.81(0.16, 3.26) $\mu\text{g/L}$ vs. 1.37(0.21, 4.84) $\mu\text{g/L}$, $P<0.001$]. Patients with orchitis or AZFc deletion, cryptorchidism, KS, idiopathic azoospermia have different AMH levels [(0.15(0.01,0.41) $\mu\text{g/L}$, 5.71(3.57,8.26) $\mu\text{g/L}$, 2.29(1.36,3.81) $\mu\text{g/L}$, 0.15(0.05,0.39) $\mu\text{g/L}$, 2.46(0.75,5.49) $\mu\text{g/L}$, $P<0.001$]. Idiopathic azoospermia patients who obtained sperms also had lower testosterone and AMH levels but higher age than those without sperm [(35.2 \pm 8.9) years vs. (32.5 \pm 5.5) years, $P=0.010$; (3.1 \pm 1.4) $\mu\text{g/L}$ vs. (3.7 \pm 2.1) $\mu\text{g/L}$, $P=0.029$; 1.63(0.35,3.84) $\mu\text{g/L}$ vs. 3.00(1.20,6.68) $\mu\text{g/L}$, $P=0.001$]. There were no statistical differences in testicular volume and FSH level between the two groups (all $P>0.05$). Receiver operating characteristic (ROC) curve showed that cut-off of serum AMH for successful sperm retrieval of idiopathic azoospermia patients was determined to be 2.96, with a sensitivity of 0.710 and specificity of 0.523, area under the curve (AUC) was 0.649. In the cases presenting heterogeneous seminiferous tubules during micro-TESE had lower AMH level and higher SRR than those presenting homogeneous seminiferous tubules [0.55(0.12, 2.05) $\mu\text{g/L}$ vs. 2.99(0.76, 6.11) $\mu\text{g/L}$, $P<0.001$; 75.9% (236/311) vs. 17.8% (34/191), $P<0.001$]. **Conclusion** NOA patients with low AMH level would have more opportunity to present heterogeneous seminiferous tubules when micro-TESE was performed and had higher SRR, especially in the idiopathic NOA cases.

【Key words】 Anti-Müllerian hormone; Azoospermia; Microdissection testicular sperm extraction

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·男性不育专栏·

CFAP43 或 *CFAP44* 基因突变致精子鞭毛多发形态异常患者的辅助生殖助孕结局研究

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【摘要】 目的 探讨 *CFAP43* 或 *CFAP44* 基因突变致精子鞭毛多发形态异常 (multiple morphological abnormalities of the flagella, MMAF) 患者行卵胞质内单精子注射 (intracytoplasmic sperm injection, ICSI) 助孕的临床结局。方法 回顾性队列研究分析 2014 年 9 月至 2020 年 7 月期间于安徽医科大学第一附属医院妇产科生殖医学中心就诊的 121 例 MMAF 男性不育患者的临床资料和基因检测结果, 纳入 9 例 *CFAP43* 或 *CFAP44* 基因突变 MMAF 患者, 5 例 MMAF 患者 (P3、P5、P7、P8 和 P9) 选择 ICSI 助孕治疗, 统计并分析这 5 例患者 ICSI 助孕的临床结局。结果 Sanger 测序证实 9 例 MMAF 患者携带 *CFAP43* 或 *CFAP44* 基因双等位基因突变, 其中 3 例患者的突变位点以往未曾报道, 分别为 *CFAP43* 基因的新发纯合突变 (c.4132delC: p.Arg1378Glufs*10) 和新发复合杂合突变 (c.3938G>A: p.Arg1313Gln; c.4342G>A: p.Glu1448Lys) 以及 *CFAP44* 基因的新发复合杂合突变 (c.1718C>A: p.Pro573His; c.4075G>A: p.Glu1359Lys)。5 例 MMAF 患者夫妇接受 5 个 ICSI 周期, 已生育 4 个健康亲生子女。*CFAP43* 或 *CFAP44* 基因突变 MMAF 患者组 ICSI 受精率为 76.47% (39/51), 5 例患者中临床妊娠 3 例, 活产 3 例。与 *DNAH1* 基因突变 MMAF 患者组和严重少弱精子症患者组相比, *CFAP43* 或 *CFAP44* 基因突变 MMAF 患者 ICSI 助孕结局差异均无统计学意义 (均 $P>0.05$)。结论 *CFAP43* 或 *CFAP44* 基因突变会导致精子严重的鞭毛畸形和运动能力下降, 是 MMAF 的重要病因。ICSI 技术可以有效地解决 *CFAP43* 或 *CFAP44* 基因突变 MMAF 患者的生育难题。

【关键词】 精子注射,细胞质内; 全外显子组测序; *CFAP43*; *CFAP44*;
精子鞭毛多发形态异常; 辅助生殖结局

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Assisted reproduction outcomes for patients with multiple morphological abnormalities of the sperm flagella caused by *CFAP43* or *CFAP44* gene mutations

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【Abstract】 Objective To investigate the clinical outcomes of patients with multiple morphological abnormalities of the flagella (MMAF) caused by *CFAP43* or *CFAP44* gene mutations following intracytoplasmic sperm injection (ICSI). **Methods** Clinical data and genetic information were retrospectively analyzed for

121 MMAF patients who attended Reproductive Medicine Center, Department of Obstetrics and Gynecology, the First Affiliated Hospital of Anhui Medical University during September 2014 to July 2020. Totally 9 MMAF patients were identified to carry *CFAP43* or *CFAP44* mutations, 5 of them (P3, P5, P7, P8, and P9) received ICSI treatments, the ICSI outcomes were further analyzed. **Results** Sanger sequencing validated 9 MMAF patients harboring *CFAP43* or *CFAP44* biallelic mutations, our study firstly identified a novel homozygous mutation of *CFAP43*(c.4132delC: p.Arg1378Glufs*10), novel compound heterozygous mutations of *CFAP43* (c.3938G>A: p.Arg1313Gln;c.4342G>A:p.Glu1448Lys) and novel compound heterozygous mutations of *CFAP44* (c.1718C>A:p.Pro573His; c.4075G>A: p.Glu1359Lys). The 5 MMAF patients underwent 5 ICSI cycles, 4 healthy offspring were obtained. The rate of fertilization of *CFAP43*- or *CFAP44*-mutated MMAF patients following ICSI was 76.47% (39/51), 3 patients' wife got clinical pregnancy, 3 patients got live birth delivery, respectively. No significant differences were found in ICSI outcomes among *CFAP43*-mutated or *CFAP44*-mutated MMAF patients, *DNAH1*-mutated MMAF patients, and severe oligoasthenozoospermia group (all $P>0.05$). **Conclusion** *CFAP43* or *CFAP44* mutations are responsible for the malformation of sperm flagella and decrease of sperm motility, and validated as the important genetic causes of MMAF. *CFAP43*- or *CFAP44*-mutated MMAF patients could have a favorable treatment outcome following ICSI.

【Key words】 Sperm injection, intracytoplasmic; Whole exome sequencing; *CFAP43*; *CFAP44*; Multiple morphological abnormalities; Assisted reproduction outcomes

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·男性不育专栏·

m6A 甲基化修饰在精子发生中的研究进展

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【摘要】 N6-甲基腺嘌呤(N6-methyladenosine, m6A)甲基化作为真核生物中最常见的 RNA 修饰, 通过甲基化转移酶、去甲基化酶、甲基化识别蛋白三种调控因子参与多种细胞进程和疾病进展。近年来的研究表明 m6A 甲基化修饰参与了精子发生的整个过程, 其失调造成的生精障碍可能导致男性不育。本文就 m6A 调控因子在睾丸中的时空表达、m6A 甲基化在精子发生中的作用机制以及 m6A 甲基化调控异常与男性不育等方面的研究进展作一综述, 旨在为男性不育的基础研究和临床治疗提供参考。

【关键词】 精子发生; N6-甲基腺嘌呤甲基化; 不育, 男性; 表观遗传

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Research progress of m6A methylation modification in spermatogenesis

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【 Abstract 】 N6-methyladenosine (m6A) is the most common RNA modification in eukaryotes, involving in various cellular processes and disease progression through three regulatory factors: methyltransferase, demethylase and methylated reading protein. Recent studies have shown that m6A methylation modification is involved in the whole process of spermatogenesis, and the dysfunction of spermatogenesis caused by its disorder may lead to male infertility. In this review, the temporal and spatial expression of m6A regulatory factors in testis, the mechanism of m6A methylation in spermatogenesis, and the abnormal m6A methylation regulation and male infertility were reviewed, aiming to provide a new direction for the basic research and clinical treatment of male infertility.

【 Key words 】 Spermatogenesis; N6-methyladenosine methylation; Infertility, male; Epigenetic

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·男性不育专栏·

《男性氧化应激性不育: 特发性男性不育症的专业术语建议和临床实践指南》解读

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【摘要】 由美国生殖医学中心牵头, 全球 27 个国家的生殖领域专家共同参与编写并于 2019 年发表了《男性氧化应激性不育: 特发性男性不育症的专业术语建议和临床实践指南》[Male Oxidative Stress Infertility (MOSI): Proposed Terminology and Clinical Practice Guidelines for Management of Idiopathic Male Infertility, 以下简称《MOSI 实践指南》]。指南阐述了氧化应激(oxidative stress, OS)致男性不育的病理生理学、MOSI 概念的提出、诊断及治疗。本文通过对《MOSI 实践指南》的重要章节进行解读, 以期为临床医师提供参考。

【关键词】 男性氧化应激性不育; 特发性男性不育症; 实践指南; 解读

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Interpretation of Male Oxidative Stress Infertility (MOSI): Proposed Terminology and Clinical Practice Guidelines for Management of Idiopathic Male Infertility

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【Abstract】 Leading by American Center for Reproductive Medicine, more than 27 reproductive experts around the world participated in writing and publishing *Male Oxidative Stress Infertility (MOSI): Proposed Terminology and Clinical Practice Guidelines for Management of Idiopathic Male Infertility* (hereinafter referred to as *MOSI practice guidelines*) in 2019. The guideline formulated the physiological pathology of male infertility caused by oxidative stress (OS), the concept, diagnosis and treatment of MOSI. This article interpreted the important chapters of *MOSI practice guidelines* in order to provide reference for clinicians.

【Key words】 Male oxidative stress infertility; Idiopathic male infertility; Practice guidelines; Interpretation

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·男性不育专栏·

欧洲男科学会《Klinefelter 综合征指南 (2021)》解读与思考

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【摘要】 Klinefelter 综合征是最常见的男性性染色体异常性疾病之一, 但其病因尚不明确, 临床表现多样, 诊断率低, 且治疗方案具体细则仍存争议。欧洲男科学会于 2021 年发布了首个《Klinefelter 综合征指南》, 回顾了 Klinefelter 综合征的新近研究成果, 对其病因、流行病学、筛查及治疗等进行了详细阐述。该指南共有 47 条推荐条款, 涵盖了不同年龄阶段 Klinefelter 综合征的临床表现、随访项目、筛查及治疗方案的选择, 为 Klinefelter 综合征的规范诊治提供了切实可行的建议。

【关键词】 Klinefelter 综合征; 筛查; 睾酮替代治疗; 精子冷冻; 睾丸取精术

Interpretation and discussion of 2021 European Academy of Andrology Guidelines on Klinefelter Syndrome

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【Abstract】 Klinefelter syndrome (KS) is one of the most common male sex chromosome abnormalities with diverse clinical manifestation and low diagnostic rate, though the specific details of treatment options remain controversial. European Academy of Andrology issued guidelines on KS in 2021 for the first time in the world according to recent evidence, and comprehensively described the etiology, epidemiology, screening and treatment of KS. The guideline consists of 47 recommendations covering the scopes of clinical manifestations, follow-up programs, screening and treatment options for KS at different ages, and provides more reasonable and standardized guidance for the management of KS.

【Key words】 Klinefelter syndrome; Screening; Testosterone replacement treatment; Sperm

cryopreservation; Testicular sperm extraction

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·临床研究·

子宫内膜异位症患者冻融胚胎移植周期应用来曲唑行内膜准备方案有效性的随机对照研究

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【摘要】 目的 探讨子宫内膜异位症患者冻融胚胎移植周期应用来曲唑行内膜准备方案的临床有效性。方法 采用随机对照研究, 收集 2019 年 1 月至 2020 年 12 月期间在上海集爱遗传与不育诊疗中心进行冻融胚胎移植的 143 例子宫内膜异位症患者, 根据内膜准备方案, 计算机数字随机将患者分为来曲唑组 (69 例) 和促性腺激素释放激素激动剂-激素替代 (gonadotropin-releasing hormone agonist-hormone replacement therapy, GnRH-a-HRT) 组 (74 例), 主要观察指标为临床妊娠率。结果 两组患者的移植胚胎数、囊胚移植比例、优质胚胎率、内膜准备时间差异均无统计学意义 (均 $P>0.05$)。GnRH-a-HRT 组的雌二醇峰值 [(417.8 ± 102.7) ng/L]、移植日子宫内膜厚度 [(10.2 ± 1.6) mm] 和移植周期药物费用 [(3259.2 ± 134.3) 元] 均高于来曲唑组 [(188.5 ± 44.8) ng/L, $P<0.001$; (8.9 ± 1.4) mm, $P=0.007$; (356.9 ± 79.9) 元, $P<0.001$]。来曲唑组的超声检查次数 [(3.8 ± 0.9) 次] 和静脉抽血次数 [(2.8 ± 0.9) 次] 多于 GnRH-a-HRT 组 [(2.4 ± 0.4) 次, $P=0.041$; (1.4 ± 0.4) 次, $P=0.022$]。两组的胚胎种植率、临床妊娠率、双胎妊娠率和异位妊娠率差异均无统计学意义 (均 $P>0.05$)。GnRH-a-HRT 组的流产率相对来曲唑组有升高趋势, 但差异无统计学意义 ($P>0.05$)。结论 子宫内膜异位症患者冻融胚胎移植周期应用来曲唑行内膜准备方案可获得与 GnRH-a-HRT 方案相同的胚胎种植率和临床妊娠率, 并且来曲唑方案的药物费用低于 GnRH-a-HRT 方案。

【关键词】 子宫内膜异位症； 胚胎移植； 来曲唑； 促性腺激素释放激素； 激素替代周期； 临床妊娠率
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Clinical effectiveness following endometrial preparation of letrozole for frozen-thawed embryo transfer in patients with endometriosis: a randomized controlled trial

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【Abstract】 Objective To evaluate clinical effectiveness of endometrial preparation of letrozole stimulation protocol for frozen-thawed embryo transfer (FET) in patients with endometriosis. **Methods** In this prospective, controlled randomized trial, a total of 143 endometriosis women who underwent FET in Shanghai Ji Ai Genetics and IVF Institute from January 2019 to December 2020 were randomly assigned to two groups according to computer digital: 69 patients received letrozole stimulation protocol (letrozole group) and 74 patients received hormone replacement therapy with gonadotropin-releasing hormone agonist (GnRH-a-HRT group). Clinical data between two groups were compared and the primary outcome was clinical pregnancy rate. **Results** There were no significant differences in the number of embryos transferred, the proportion of blastocysts transferred, high-quality embryo rate and duration of endometrial preparation (all $P>0.05$). Peak estradiol levels $[(417.8\pm102.7) \text{ ng/L}]$, endometrial thickness on transfer day $[(10.2\pm1.6) \text{ mm}]$ and drug cost $[(3\ 259.2\pm134.3) \text{ yuan}]$ in GnRH-a-HRT group were significantly higher than those in letrozole group $[(188.5\pm44.8) \text{ ng/L}, P<0.001; (8.9\pm1.4) \text{ mm}, P=0.007; (356.9\pm79.9) \text{ yuan}, P<0.001]$. The numbers of ultrasound scan (3.8 ± 0.9) and venous samplings (2.8 ± 0.9) in letrozole group were more than those in GnRH-a-HRT group $(2.4\pm0.4, P=0.041; 1.4\pm0.4, P=0.022)$. The implantation rate, the clinical pregnancy rate, the twin pregnancy rate and the ectopic pregnancy rate were similar in both groups (all $P>0.05$). No significant difference was found in the miscarriage rate although miscarriage rate in GnRH-a-HRT group seemed higher than that of letrozole group (all $P>0.05$). **Conclusion** Endometrial preparation of letrozole stimulation protocol for FET in patients with endometriosis showed similar pregnancy outcomes when compared with GnRH-a-HRT protocol. The drug cost is more economical in letrozole stimulation protocol.

【Key words】 Endometriosis; Embryo transfer; Letrozole; Gonadotropin-releasing hormone agonist; Hormone replacement; Clinical pregnancy rate

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· 临床研究 ·

高龄多囊卵巢综合征患者 IVF/ICSI-ET 助孕结局研究

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【摘要】 目的 研究高龄多囊卵巢综合征(polycystic ovary syndrome, PCOS)患者在行体外受精/卵胞质内单精子注射-胚胎移植(*in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer, IVF/ICSI-ET)助孕促排卵过程的卵巢反应性及妊娠结局的影响。方法 采用回顾性队列研究,选择2016年1月1日至2018年12月31日期间在北京大学第三医院生殖医学中心首次行IVF/ICSI助孕的201例高龄PCOS女性患者为PCOS组,按照1:1匹配原则,选取在同时期进周期的、单纯因输卵管因素首次行IVF/ICSI助孕的高龄非PCOS月经规律的201例患者记为对照组。并选取此次取卵周期的前三个解冻周期,高龄PCOS患者因卵巢过度刺激综合征发生率更高,进行冷冻胚胎的人数更多,因此高龄PCOS患者解冻周期多于对照组患者。PCOS组共215个周期,对照组共124个周期,分析两组患者的临床资料和IVF实验室资料。结果 ①PCOS组与对照组相比,抗苗勒管激素(anti-Müllerian hormone, AMH)和窦卵泡计数(antral follicle count, AFC)差异均有统计学意义[(7.66±4.62) μg/L 比 (1.89±1.44) μg/L, $P=0.005$; 26.44±8.06 比 9.33±4.05, $P<0.001$]; PCOS组的优质胚胎率高于对照组[58.04% (1281/2207) 比 57.20% (743/1299), $P=0.005$]。②PCOS组促排卵过程中促性腺激素(gonadotropin, Gn)用量更少[(2 090.17±909.74) U 比 (2 969.14±1 101.79) U, $P=0.009$]、获卵数更多[(15.17±8.35) 枚比 (9.51±5.83) 枚, $P<0.001$]; PCOS组的临床妊娠率、流产率、异位妊娠率、累积活产率与对照组相比差异均无统计学意义(均 $P>0.05$)。③年龄、体质质量指数(body mass index, BMI)、睾酮水平、促排卵方案及移植胚胎数为临床妊娠率的独立影响因素($P=0.028$ 、 $P=0.004$ 、 $P=0.027$ 、 $P=0.014$ 、 $P<0.001$) ; BMI和移植胚胎数为活产率的独立影响因素($P=0.008$ 、 $P<0.001$)。结论 ①高龄PCOS患者有更高的卵泡储备量。②累积活产率更能真实地反映高龄PCOS患者生育窗情况,高龄PCOS患者累积活产率

随着年龄的增长明显优于非 PCOS 患者；PCOS 患者的生育窗较非 PCOS 患者延长。③对高龄患者应尽快完善化验结果，尽可能缩短 IVF/ICSI 周期前期等待时间，尽早进行辅助生育治疗，获得更好的妊娠结局。

【关键词】 多囊卵巢综合征； 生殖技术，辅助； 受精，体外； 胚胎移植； 妊娠结局； 高龄

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Pregnancy outcome of IVF/ICSI-ET in elderly patients with polycystic ovary syndrome

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【 Abstract 】 **Objective** To study the effect of *in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer (IVF/ICSI-ET) on ovarian responsiveness during ovulation induction and pregnancy outcome in elderly patients with polycystic ovary syndrome (PCOS). **Methods** A retrospective cohort study was conducted, and 201 elderly women with PCOS who underwent IVF/ICSI for the first time in the Reproductive Medical Center of Peking University Third Hospital from January 1, 2016 to December 31, 2018 were selected as PCOS group. According to the 1:1 matching principle, selected 201 elderly patients with non-PCOS menstrual regularity who entered the cycle at the same time as the elderly PCOS patients and underwent IVF/ICSI for the first time due to tubal factors alone named control group. The first three thawing cycles of this egg retrieval cycle were selected. Due to the higher incidence of ovarian hyperstimulation syndrome and the number of aging PCOS patients undergoing embryo freezing, the thawing cycles of the elderly PCOS patients were more than those of control group. A total of 215 cycles in PCOS group and 124 cycles in control group were used to analyze the clinical data and IVF/ICSI laboratory data. **Results** 1) Between PCOS group and control group, anti-Müllerian hormone (AMH) and antral follicle count (AFC) were significantly different [(7.66±4.62) µg/L vs. (1.89±1.44) µg/L, $P=0.005$; 26.44±8.06 vs. 9.33±4.05, $P<0.001$]; the rate of high-quality embryos in PCOS group was higher than that in control group [58.04% (1281/2207) vs. 57.20% (743/1299), $P=0.005$]. 2) The dosage of gonadotropin (Gn) used during ovulation induction in PCOS group was less than that in control group [(2 090.17±909.74) U vs. (2 969.14±1 101.79) U, $P=0.009$], but the number of oocytes retrieval was more than that in control group (15.17±8.35 vs. 9.51±5.83, $P<0.001$). The clinical pregnancy rate, the miscarriage rate, the ectopic pregnancy rate and the cumulative live birth rate of PCOS group were not significantly different from those of control group (all $P>0.05$). 3) Age, body mass index (BMI), testosterone level, ovulation stimulation program and the number of transferred embryos were the independent influencing factors of the clinical pregnancy rate ($P=0.028$, $P=0.004$, $P=0.027$, $P=0.014$, $P<0.001$); BMI and the number of transferred embryos were the independent influencing factors of the live birth rate ($P=0.008$, $P<0.001$). **Conclusion** 1) Elderly PCOS patients have higher follicle

reserve. 2) The cumulative live birth rate can more truly reflect the fertility window of elderly PCOS patients. The cumulative live birth rate of elderly PCOS patients is significantly better than that of control group with the increase of age; the reproductive window of PCOS patients is longer than that of non-PCOS patients. 3) For elderly patients, the laboratory results should be improved as soon as possible, the waiting time in the early stage of the IVF/ICSI cycle should be shortened as much as possible, and assisted reproductive treatment should be performed as soon as possible to obtain better pregnancy outcomes.

【 Key words 】 Polycystic ovary syndrome; Reproductive technologies, assisted; Fertilization *in vitro*; Embryo transfer; Pregnancy outcome; Elderly

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·临床研究·

不同取精方式行 ICSI 对临床妊娠及围产结局的影响

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【摘要】 目的 探讨不同取精方式对行卵胞质内单精子注射 (intracytoplasmic sperm injection, ICSI) 助孕患者临床妊娠及围产结局的影响。方法 采用回顾性队列研究分析 2015 年 10 月至 2020 年 10 月期间于郑州大学第三附属医院生殖医学科因男性因素行 ICSI 助孕的患者临床资料, 共 3096 个周期。少弱畸形症患者采用射精方式取精, 记为射精组 ($n=2558$); 无精子症患者采用手术方法取精 (PESA/TESA/mirco-TESE), 记为手术取精组 ($n=538$)。比较分析两组患者的促排卵情况、胚胎培养情况, 观察两组鲜胚移植患者临床妊娠结局及围产结局指标的变化。结果 经过线性/logistic 回归调整混杂因素后, 手术取精组相对于射精组的优质胚胎数 [MD (95% CI) =0.412 (0.153~0.670), $P=0.002$] 及囊胚形成数 [MD (95% CI) =0.265 (0.035~0.494), $P=0.024$] 明显升高, 正常受精 (双原核) 数及可利用胚胎数差异均无统计学意义 (均 $P>0.05$); 鲜胚移植后患者

的胚胎种植率 [$aOR(95\% CI)=1.311(1.010\sim1.701)$, $P=0.042$] 及临床妊娠率 [$aOR(95\% CI)=1.307(1.007\sim1.697)$, $P=0.044$] 明显升高; 组间活产率、多胎率、流产率、单胎早产率、单胎足月新生儿体重及性别比差异均无统计学意义 (均 $P>0.05$)。结论 无精子症患者通过手术取精可获得与常规 ICSI 相当的活产率, 并不会增加流产、胎儿畸形、单胎早产、足月低体重儿等风险。

【关键词】 精子注射, 细胞质内; 取精方式; 妊娠结局; 围产期结局

Effects of different sperm extraction methods on clinical pregnancy and perinatal outcome

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【Abstract】 **Objective** To investigate the effects of different sperm retrieval methods on clinical pregnancy and perinatal outcomes in patients undergoing intracytoplasmic sperm injection (ICSI) for pregnancy. **Methods** A retrospective cohort study was conducted to analyze the clinical data of patients who underwent ICSI for male factors in Reproductive Center of the Third Affiliated Hospital of Zhengzhou University from October 2015 to October 2020. A total of 3096 cycles were included. Patients with oligozoospermia had sperm retrieval by ejaculation, which was recorded as ejaculation group ($n=2558$); patients with azoospermia had sperm retrieval by surgical method (PESA/TESA/mirco-TESE), which was recorded as surgical sperm retrieval group ($n=538$). The ovulation promotion and embryo culture of the two groups were compared and analyzed, and the clinical pregnancy outcome and perinatal outcome indexes of fresh embryo transfer patients in the two groups were observed. **Results** Data from both groups were adjusted for confounding factors by linear/logistic regression, which revealed that the number of high-quality embryos [$MD(95\% CI)=0.412(0.153\sim0.670)$, $P=0.002$] and blastocyst formation [$MD(95\% CI)=0.265(0.035\sim0.494)$, $P=0.024$] were significantly higher in surgical sperm retrieval group relative to ejaculation group, and the number of two pronuclei (2PN) and the number of available embryos were not statistically different (all $P>0.05$). The embryo implantation rate [$aOR(95\% CI)=1.311(1.010\sim1.701)$, $P=0.042$] and the clinical pregnancy rate [$aOR(95\% CI)=1.307(1.007\sim1.697)$, $P=0.044$] were significantly higher in patients after fresh embryo transfer. The differences in live birth rate, multiple birth rate, miscarriage rate, singleton preterm birth rate, singleton full-term neonatal weight and sex ratio between the two groups were not statistically significant (all $P>0.05$). **Conclusion** Patients with azoospermia can still obtain a live birth rate comparable to that of conventional ICSI through surgical sperm retrieval and do not increase the risk of miscarriage, fetal malformation, singleton preterm birth, or full-term low birth weight babies.

【Key words】 Sperm injection, intracytoplasmic; Sperm retrieval method; Pregnancy outcome; Perinatal outcome

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·临床研究·

滋肾育胎丸对比安慰剂在进行新鲜胚胎移植周期的妇女中提高活产率的作用——一项随机对照临床试验

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【摘要】 目的 评价滋肾育胎丸对新鲜胚胎移植周期妇女活产率的影响。方法 采用多中心、随机、双盲、安慰剂对照临床试验设计方法, 研究服用滋肾育胎丸是否能改善行体外受精/卵胞质内单精子注射 (*in vitro* fertilization/intracytoplasmic sperm injection, IVF/ICSI) 的新鲜胚胎移植周期妇女的妊娠结局。主要结局指标为活产率。次要结局指标为种植率、生化妊娠率、临床妊娠率、流产率、取消周期率, 以及孕妇、胎儿、新生儿并发症发生率。按 1:1 比例纳入 2265 例受试者, 比较滋肾育胎丸组与安慰剂组之间活产率的差异。受试者入组后, 采用区组随机法随机分配接受滋肾育胎丸或安慰剂治疗; 在试验过程中, 药物服用剂量为一日 3 次, 一次 5 g。结果 招募于 2014 年 4 月至 2017 年 6 月期间进行。随访于 2018 年 6 月完成。2265 例患者进入随机分配, 其中, 1131 例患者进入滋肾育胎丸组, 1134 例患者分配到安慰剂组。两组间人口学特征相近。在意向性分析中, 滋肾育胎丸组及安慰剂组的活产率分别为 26.8% (303/1131)、23.0% (261/1134), 差异有统计学意义 ($RR=1.16$, 95% $CI=1.01\sim1.34$, $P=0.038$); 种植率分别为 36.8% (482/1310)、32.6% (410/1256), 差异有统计学意义 ($RR=1.13$, 95% $CI=1.01\sim1.25$, $P=0.027$)。滋肾育胎丸组及安慰剂组的生化妊娠率分别为 35.5% (402/1131)、31.1% (353/1134), 差异有统计学意义 ($RR=1.14$, 95% $CI=1.02\sim1.28$, $P=0.026$), 临床妊娠率则分别为 31.2% (353/1131)、27.3% (310/1134), 差异

有统计学意义 ($RR=1.14$, 95% $CI=1.00\sim1.30$, $P=0.043$)。两组间的流产率及孕妇、胎儿、新生儿并发症发生率差异均无统计学意义 (均 $P>0.05$)。结论 滋肾育胎丸能有效提高新鲜胚胎移植周期妇女的活产率。

【关键词】 生殖技术, 辅助; 中药; 不孕症; 妊娠结局

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Effects of Zishen Yutai Pill compared with placebo on live births among women in a fresh embryo transfer cycle: a randomized controlled trial

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【Abstract】 Objective To assess the efficacy of Zishen Yutai Pill compared with placebo on live birth rate among women following fresh embryo transfer cycles. **Methods** We conducted a double-blind, multicenter, placebo-controlled, randomized trial to investigate whether administration of Zishen Yutai Pill would improve pregnancy outcomes among women undergoing fresh embryo transfer following *in vitro* fertilization or intracytoplasmic sperm injection. The primary outcome was live birth rate. Secondary outcomes were rates of implantation, biochemical pregnancy, clinical pregnancy, pregnancy loss, cycle cancellation, maternal, fetal and neonatal complications. A total of 2265 sample size (1:1 in two groups) was used to detect a live birth rate difference between Zishen Yutai Pill and placebo. Participants were enrolled and randomized to receive 5 g of Zishen Yutai Pill or placebo orally, three times per day during the study using block randomization method. **Results** Recruitment was completed between April 2014 and June 2017, with 2580 patients screened. Follow-up was completed in June 2018. Totally 2265 patients were randomized, 1131 to Zishen Yutai Pill group and 1134 to placebo group. Characteristics were similar between the two groups. In intention-to-treat analysis, the rates of live birth in Zishen Yutai Pill group and placebo group were 26.8% (303/1131) and 23.0% (261/1134), respectively, the difference was statistically significant ($RR=1.16$, 95% $CI=1.01\sim1.34$, $P=0.038$). The implantation rates were 36.8% (482/1310) and 32.6% (410/1256) in Zishen Yutai Pill group and placebo group, respectively, the difference was statistically significant ($RR=1.13$, 95% $CI=1.01\sim1.25$, $P=0.027$). The biochemical pregnancy rate in Zishen Yutai Pill group was 35.5% (402/1131) vs. 31.1% (353/1134) in placebo group, the difference was statistically significant ($RR=1.14$, 95% $CI=1.02\sim1.28$, $P=0.026$). The rates of clinical pregnancy in Zishen Yutai Pill group and placebo group were 31.2% (353/1131) and 27.3% (310/1134), respectively, the difference was statistically significant ($RR=1.14$, 95% $CI=1.00\sim1.30$, $P=0.043$). There were no significant differences between the two groups in the rates of pregnancy loss, maternal, or neonatal complications (all

$P>0.05$). **Conclusion** Zishen Yutai Pill increased the rate of live birth after fresh embryo transfer compared with placebo.

【Key words】 Reproduction technology, assisted; Traditional Chinese Medicine; Infertility; Pregnancy outcomes

Fund program: Guangdong Provincial Secondary Development Project of Famous and Excellent Chinese Patent Medicine (20174002); Guangzhou Science and Technology Plan Project (201704020046)

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·临床报道·

齿轮状透亮致密透明带 M_I 期卵母细胞患者行 ICSI/Re-ICSI 结局

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【摘要】 目的 探讨齿轮状透亮致密透明带、卵周间隙小患者行卵胞质内单精子注射 (intracytoplasmic sperm injection, ICSI) /补救 ICSI (rescue-ICSI, Re-ICSI) 妊娠结局。方法 回顾性病例对照研究 2015 年 1 月至 2020 年 6 月期间于石家庄市第四医院生殖医学中心就诊的 6 对夫妇共 8 个周期卵子透明带异常, 其中 5 对夫妇 6 个周期 M_I 卵占比 $\geq 50\%$ (部分卵 M_I 阻滞), 1 对夫妇 2 个周期为全部卵 M_I 阻滞。对 M_{II} 卵行 ICSI 或体外受精 (*in vitro* fertilization, IVF) 短时受精, IVF 短时受精完全受精失败, 行 Re-ICSI; 对 M_I 卵同时行 ICSI/Re-ICSI。比较 M_{II} 卵和 M_I 卵、全部卵 M_I 阻滞和部分卵 M_I 阻滞之间 ICSI/Re-ICSI 受精率、退化率、卵裂率、优质胚胎率、囊胚率。结果 37 枚 M_{II} 卵和 65 枚 M_I 卵行 ICSI/Re-ICSI, M_I 卵受精率、2PN 受精率均低于 M_{II} 卵 [46.2% (30/65) 比 89.2% (33/37); 32.3% (21/65) 比 83.8% (31/37), 均 $P<0.001$], 两组均有优质胚胎及囊胚形成; 全部卵 M_I 阻滞与部分卵 M_I 阻滞相比, M_I 卵受精率、退化率、优质胚胎率及囊胚形成率差异均无统计学意义 (均 $P>0.05$)。结论 对透明带异常的 M_I 卵占比高的患者行 ICSI/Re-ICSI, 可增加患者卵子利用率和可用胚胎。

【关键词】 精子注射，细胞质内； M_I 卵； 透明带异常

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Pregnancy outcome of ICSI/Re-ICSI M_I oocytes in gear-like transparent dense zona pellucida

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【 Abstract 】 Objective To explore the pregnancy outcome of intracytoplasmic sperm injection (ICSI)/rescue-ICSI (Re-ICSI) patients with gear-like transparent dense zona pellucida and small perivitelline oocytes. **Methods** Totally 6 couples with abnormal zona pellucida came to the Reproductive Medicine Center of Shijiazhuang the Fourth Hospital from January 2015 to June 2020 were retrospectively case control analyzed. A total of 8 cycles had zona pellucida abnormalities, of which 5 couples, the proportion of M_I oocytes was $\geq 50\%$ (part oocytes M_I arrest) in 6 cycles and 1 couple (2 cycles) was all oocytes M_I arrest. ICSI or *in vitro* fertilization (IVF) short-term fertilization was performed on M_{II} oocytes with abnormal zona pellucida in controlled superovulation, IVF short-time fertilization failed completely, and Re-ICSI was performed. M_I oocytes were performed ICSI/Re-ICSI simultaneously. The ICSI/Re-ICSI fertilization rate, degeneration rate, cleavage rate, high-quality embryo rate and blastocyst rate were compared between the two groups of M_{II} oocytes and M_I oocytes, as well as all oocytes M_I arrest and part oocytes M_I arrest groups, respectively. **Results** Totally 37 M_{II} oocytes and 65 M_I oocytes underwent ICSI/Re-ICSI. M_I oocytes fertilization and 2PN fertilization rates were lower than M_{II} oocytes [46.2%(30/65) vs. 89.2%(33/37); 32.3% (21/65) vs. 83.8% (31/37), all $P < 0.001$]. Both groups had high-quality embryos and blastocyst formation. Compared with part oocytes M_I arrest and all oocytes M_I arrest, there was no statistical difference in fertilization rate, degeneration rate, high-quality embryo rate and blastocyst formation rate between the two groups (all $P > 0.05$). **Conclusion** ICSI/Re-ICSI for patients with abnormal zona pellucida with a high proportion of M_I oocytes can increase the patients' oocytes utilization rate and available embryos.

【 Key words 】 Sperm injection, intracytoplasmic; Metaphase I; Abnormal zona pellucida

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脐孔子宫内膜异位症 4 例报道并文献复习

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【摘要】 目的 探讨脐孔子宫内膜异位症临床发病特点、诊断和治疗策略。方法 分析 4 例脐孔子宫内膜异位症患者的临床资料, 并进行相关文献复习回顾。结果 4 例患者行脐部异位内膜切除术, 病理组织学提示真皮下纤维组织内存在子宫内膜腺体、间质和含铁血黄素的巨噬细胞, 证实为脐孔子宫内膜异位症, 术后随访无复发。结论 脐孔子宫内膜异位症发病率较低, 但存在复发和恶性转化的可能, 临床上应重视妇科体检, 早发现早治疗, 并结合病理活检予以确诊, 减少漏诊和提高治愈率。

【关键词】 脐孔子宫内膜异位症; 原发性; 继发性; 病理诊断; 治疗策略

Umbilical endometriosis: a report of 4 cases and literature review

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【 Abstract 】 Objective To investigate the clinical characteristics, diagnosis and treatment strategy of umbilical endometriosis. **Methods** The clinical data of 4 cases with umbilical endometriosis were analyzed and the related literatures were reviewed. **Results** Ectopic umbilical endarterectomy was performed in 4 patients. Histopathology showed that there were endometrial glands,

stroma and macrophages containing hemosiderin in subdermal fibrous tissue, which was confirmed as umbilical endometriosis. **Conclusion** The incidence rate of umbilical endometriosis is low, but there is a possibility of recurrence and malignant transformation. Gynecological examination should be emphasized in clinic. Early detection and early treatment should be paid attention to, and combined with pathological biopsy, diagnosis should be made to reduce missed diagnosis and improve the cure rate.

【Key words】 Umbilical endometriosis; Primary; Secondary; Pathologic diagnosis; Treatment strategy

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·个案报道·

腹腔镜子宫肌瘤术后穿刺孔播散 1 例及文献复习

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【摘要】 目的 探讨腹腔镜子宫肌瘤电动分碎术后腹膜播散性平滑肌瘤病 (leiomyomatosis peritonealis disseminata, LPD) 的病因、临床特点及诊治进展。方法 报道 1 例典型的腹腔镜术后巨大 LPD 及其治疗经过并进行最新文献回顾。结果 术中发现腹腔镜术后巨大 LPD 寄生于既往腹腔镜穿刺孔腹膜瘢痕处, 开腹切除术后 1 年无复发。结论 LPD 与医源性使用子宫肌瘤电动分碎器有关, 是一种罕见的良性疾病, 首选手术治疗, 预后较好。

【关键词】 腹膜播散性平滑肌瘤病; 腹腔镜子宫肌瘤剔除; 电动分碎器

Port site leiomyomatosis peritonealis disseminata after laparoscopic myomectomy: a case report with literature review

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【Abstract】 Objective To investigate the etiology, clinicopathological features, treatment and prognosis of leiomyomatosis peritonealis disseminate (LPD) after laparoscopic myomectomy. **Methods** We reported a typical case of LPD and all clinical database were retrospectively analyzed. **Results** During the operation, it was found that the large disseminated leiomyoma after laparoscopic surgery was parasitic on the peritoneal scar of the previous laparoscopic puncture hole, and there was no recurrence one year after laparotomy. **Conclusion** LPD is associated with iatrogenic use of an electric fibroid fractionator. It is a rare benign disease and surgical treatment is preferred with a good prognosis.

【Key words】 Leiomyomatosis peritonealis disseminata; Laparoscopic myomectomy; Electromechanical power morcellation

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·综述·

月经血量的评价方法

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【摘要】 月经过多 (heavy menstrual bleeding, HMB) 是妇科门诊女性患者就诊最常见的原因之一, 对女性生活质量、工作效率、医疗成本产生重大影响。女性对自身月经失血量 (menstrual blood loss, MBL) 的认知是诊断和治疗 HMB 的关键决定因素。自从 50 多年前报道的碱性血红素法以来, 许多新的月经血量测量方法逐渐被开发和改进。然而, 随着 HMB 观念的更新, 对 MBL 的评价尚缺乏公认有效的方法。本文检索国内外月经血量评估的相关研究, 对月经血量评估方法进行综述, 希望通过总结不同方法的实用性和局限性, 为临床决策和实验研究中的应用提供新的思路。

【关键词】 异常子宫出血; 月经过多; 月经失血量; 月经失血评估表; 生活质量

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Measurement methods for menstrual blood loss

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【Abstract】 Heavy menstrual bleeding (HMB) is one of the most common reasons for women to visit gynecological clinics, which affects women's quality of life, work efficiency, and medical costs. Women's perception of menstrual blood loss (MBL) is a key determinant in the diagnosis and treatment of HMB. Since the publication over 50 years ago of the alkaline hematin method for quantifying MBL, many new methods have been developed and improved. However, with the updating of HMB concept, there is still no recognized effective method to evaluate MBL. This paper reviewed the methods of menstrual blood volume assessment, summarized the practicability and limitations of different methods, to provide new ideas for clinical decision-making and application in experimental research.

【Key words】 Abnormal uterine bleeding; Heavy menstrual bleeding; Menstrual blood loss; Pictorial blood loss assessment chart; Quality of life

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·综述·

细胞外囊泡对胚胎植入过程中胚胎-子宫内膜双向通讯的影响

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【摘要】 近年来辅助生殖技术迅猛发展, 为不孕不育患者带来了福音, 但目前胚胎种植成功率仍较低, 且有研究证实 50%~75% 的妊娠失败源于胚胎植入的异常。胚胎植入是正常妊娠建立的一个关键环节, 胚胎-子宫内膜双向通讯受损是导致胚胎植入失败的主要原因。许多研究证实细胞外囊泡作为新的细胞间通讯方式, 在胚胎植入过程中发挥着重要作用, 并可携带药物作为不孕症的治疗方式。本文就细胞外囊泡在胚胎植入过程中对胚胎-子宫串扰的作用及其调控机制作一论述, 期为不孕症、反复植入失败患者的诊治提供新的思路。

【关键词】 胚胎植入； 子宫内膜； 细胞外囊泡

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Effect of extracellular vesicles on embryo-endometrial crosstalk during embryo implantation

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【Abstract】 In recent years, the rapid development of assisted reproductive technology has brought good news to infertility patients, but the current success rate of embryo implantation is low. The studies have confirmed that about 50% to 75% of pregnancy failures are due to abnormal embryo implantation. Embryo implantation is a key link in the establishment of a normal pregnancy. Impaired uterine-embryo crosstalk is the main reason for embryo implantation failure. Many studies have confirmed that extracellular vesicles (EVs), as a new method of intercellular communication, play an important role in the process of embryo implantation and can carry drugs as a potential treatment for female infertility. This article reviewed the role of EVs in preimplantation uterine-embryo crosstalk and its regulatory mechanism, in order to provide a theoretical basis for the treatment of infertility and repeated implantation failure patients.

【Key words】 Embryo implantation; Endometrium; Extracellular vesicles

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