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RISKS OF MALE FACTORS INVOLVED DURING IVF CYCLES - A REVIEW

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ABSTRACT

IVF cycles are intricate processes involving a meticulously planned sequence of medical procedures aimed at overcoming infertility and achieving the dream of parenthood. The journey begins with a strong partnership between patients and reproductive specialists, where personalized care and unwavering support guide each step. Reproductive experts work to understand the complexities of infertility through compassionate communication and thorough evaluation, laying the groundwork for a hopeful and purposeful treatment plan. The path from follicle to vial, under the meticulous supervision of skilled medical professionals, unfolds with precision and care, as months of anticipation culminate in a significant moment. Each retrieved egg symbolizes the transformative power of scientific advancement and human perseverance, made possible by advanced technology and unwavering dedication. The IVF cycle enters a realm where fertilization and embryo development can be life-changing. In the lab, sperm and egg unite in a harmonious creation, sparking the delicate dance of life and giving rise to an embryo, a symbol of hope and potential. Embryologists carefully monitor the growth of these developing organisms, providing nurturing care and close observation to create an environment that promotes growth and vitality. This revolutionary process results from countless hours of dedication and relentless determination, offering individuals and couples a tangible ray of hope amidst the uncertainties of the IVF journey.

Keywords: IVF cycles, intricate processes, medical procedures, infertility, parenthood

INTRODUCTION

The desire to become parents is a fundamental aspect deeply embedded in our identities, playing a significant role in the intricate fabric of human existence. However, for many individuals and couples, this

journey occurs within the context of infertility, where traditional methods of conception may not suffice. During these challenging times, the remarkable advancements in modern medicine shine brightly, offering a path illuminated by the transformative power of assisted reproductive technologies. At the forefront of these advancements is the cutting-edge field of in vitro fertilization (IVF) cycles, a testament to the union of scientific brilliance, compassionate care, and unwavering commitment (Kalampokas et al., 2015).

IVF cycles involve a meticulously planned sequence of medical procedures designed to overcome infertility barriers and achieve the cherished goal of parenthood. As the cornerstone of reproductive medicine, IVF symbolizes hope and resilience, reflecting the combined efforts of dedicated medical professionals and the tenacity of individuals overcoming infertility challenges.

An IVF cycle begins with a profound partnership between patients and reproductive specialists, where personalized care and steadfast support guide every step of the process. Individuals embark on a collaborative journey, engaging in comprehensive discussions and diagnostic assessments to chart a path tailored to their unique needs and aspirations. Reproductive experts strive to understand the intricacies of infertility through compassionate communication and thorough evaluation, laying the foundation for a purposeful and optimistic treatment plan (Yland et al., 2019).

The emotional toll of lower fertilization rates cannot be overstated, as individuals and couples grapple with the uncertainty and despair accompanying each IVF cycle. The complex emotions associated with fertility—frustration, sadness, and despair—can be intensified when fertilization is unsuccessful. Supportive counseling and guidance are essential components of comprehensive fertility care, helping individuals and couples navigate the challenges of male infertility and IVF therapy (Krey et al., 2001).

Male infertility, resulting in lower fertilization rates, poses significant challenges for those undergoing IVF treatments. Male factor infertility can impact treatment decisions, emotional well-being, and the availability of viable embryos for transfer. Addressing male infertility through a thorough evaluation, individualized treatment strategies, and supportive care can enhance IVF outcomes and support individuals and couples in their quest to become parents.

Poor embryo quality due to male infertility can significantly affect IVF cycle outcomes, presenting substantial difficulties for those trying to conceive with assisted reproductive technologies. The quality of embryos is

crucial for implantation and pregnancy success, with higher-quality embryos demonstrating better developmental competence and viability. Poor embryo quality can decrease the likelihood of a successful pregnancy, necessitating additional measures to optimize treatment outcomes when male infertility factors are present (Ganer et al., 2023).

Male infertility encompasses a range of issues such as low sperm count, poor motility, and abnormal sperm morphology, all of which can impair sperm quality and function. These factors can hinder fertilization and result in embryos with limited developmental potential. Defects in embryo morphology, slower cell division rates, or inconsistencies in embryo growth patterns—indicative of poor embryo quality—can affect the likelihood of successful implantation and pregnancy (Wintner et al., 2017).

LITERATURE REVIEW-

Explored were the impacts of male hyperuricemia on IVF-ET reproductive outcomes. In addition to markedly lower clinical pregnancy rates and live birth rates, a substantial increase in BPLR was observed within the hyperuricemia group compared to the control cohort. Binary logistic regression analysis unveiled a positive correlation between male SUA and BPLR during fresh embryo transfer. Significance (P = 0.010) was noted in the receiver operating characteristic curve, which had an area under it of 0.784, with a specificity of 53.7% and a sensitivity of 100.0%. Moreover, the study revealed that the hyperuricemia group exhibited significantly reduced rates of total fertilization and 2PN fertilization compared to the control group. These findings illustrate that male hyperuricemia could diminish the 2PN and total fertilization rates in vitro fertilization procedures and act as an independent risk factor for higher BPLR following new embryo transfer (Wu et al., 2024).

Multivariate logistic regression analysis supported these findings, indicating that the woman's age, prior history of miscarriage, and endometrial thickness were autonomous risk factors for an early, spontaneous miscarriage on the day of embryo transfer. According to the study, individuals under 35 with uterine abnormalities, PCOS, or undergoing frozen embryo transfers had a significantly higher likelihood of spontaneous miscarriage than those solely affected by male factor infertility. Conversely, individuals aged 35 and older undergoing frozen embryo transfers exhibited a lower spontaneous miscarriage rate compared to fresh cycles (Bu et al. 2020).

Discovered was the negative impact of male aging on ICSI outcomes/clinical IVF among couples experiencing idiopathic infertility, regardless of the female's age. 95% confidence intervals and odds ratios (OR) showed a decline in live birth rates per additional year of age. The study unveiled a negative correlation between male and female age and live birth rates. Despite analyzing possible relationships between male age and factors like female age, treatment type (IVF/ICSI), and the day of embryo transfer (Day 3/Day 5), no significant relationships with outcomes were found ($P > 0.05$). Secondary outcomes indicated a significant decrease in the likelihood of clinical pregnancy with advancing female age or, and an increase in the likelihood of failure with female age. Moreover, a higher number of inseminated oocytes correlated with improved outcomes (for clinical pregnancy or for live birth). Conversely, undergoing more cycles was associated with worse outcomes (or for clinical pregnancy; or live birth: 0.96 [0.92–0.99], $P = 0.023$). Subsequent age-related analyses showed that clinical results gradually declined as male age increased, with considerably worse clinical pregnancy outcomes and rates of live births for males over 50 partnered with women under 40 ($P < 0.05$) (Horta et al., 2019).

The study examined the effects of sperm DNA fragmentation (SDF) in intracytoplasmic sperm injection (ICSI) cycles for infertile couples without male factors. Though fertilization rates were comparable between groups with high and low SDF levels, cycles with higher SDF levels exhibited reduced implantation rates, slower normal cleavage, and fewer high-quality embryos by day 3. Furthermore, even with similar conception rates, cycles that exceeded the specified SDF threshold had a notably higher miscarriage rate. These findings demonstrate the correlation between high levels of SDF and unfavorable outcomes in terms of embryonic development, implantation success, and miscarriage risk in ICSI cycles for non-male factor infertility. Additionally, the SDF test provides valuable information for evaluating sperm quality, particularly for individuals with undisclosed infertility histories (Borges et al., 2019).

CONCLUSION

In summary, an initial analysis of data from a nationally representative sample of Assisted Reproductive Technology in India suggests that male subfertility may contribute to the increased likelihood of significant birth abnormalities associated with Intracytoplasmic Sperm Injection (ICSI) and In Vitro Fertilization (IVF).

Notably, male subfertility was associated with a higher chance of hypospadias, a notable congenital abnormality, in offspring conceived through IVF and ICSI. Further investigation is necessary to confirm the impact of male subfertility on major cardiac and urogenital birth defects following IVF and ICSI procedures. This entails conducting systematic reviews and meta-analyses that differentiate the severity or type of male subfertility and consider significant confounding factors.

Moreover, the retrospective nature of the study inherently introduces biases. Retrospective studies rely on historical data, which may be incomplete or inaccurate in certain areas. Dependence on historical data can lead to recall bias or omission of information, affecting the reliability of findings. Prospective studies, although resource-intensive, have the potential to mitigate these biases by ensuring high-quality and comprehensive data collection from the outset.

Additionally, the study may not account for all potential confounding variables that could influence IVF cycle outcomes. Lifestyle habits of male partners (such as smoking and alcohol consumption), environmental exposures, and other health issues were not fully addressed. While the study offers valuable insights into the risks associated with male factors in IVF cycles, it is essential for future research to address these limitations to obtain more thorough and widely applicable results.

Achieving a deeper understanding of male infertility in the context of IVF requires improved study designs, involvement of larger and more diverse populations, prospective data collection, and consideration of additional confounding and psychological factors.

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