EMBRYO-CHAT

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TOPIC OF DISCUSSION

"IS SPERM MORPHOLOGY IMPORTANT FOR ICSI? "

CHAT DISCUSSIONS COMPILED BY

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SUMMARY OF SURVEY RESULTS

"IS SPERM MORPHOLOGY IMPORTANT FOR ICSI? "

By Team Ihera

Survey Reveals Strong Preference for sperm morphology assessment before ICSI Among Group Members Despite Mixed Evidence.

Sperm Morphology and Its Importance in ICSI

Introduction

A recent online discussion happened between the embryologists across the nation where the importance of sperm morphology was taken into consideration.

Sperm morphology plays a critical role in ICSI (Intracytoplasmic Sperm Injection) as it influences the selection of sperm for fertilization, impacting the genetic integrity of the embryo and overall success of assisted reproductive technologies (ART).

A Poll followed by a group discussion revealed majority of the embryologists prefer doing a morphology staining before any ART procedure.

Poll Results: A Strong Preference for accessing sperm morphology before performing ICSI

1. A poll was conducted among embryologists and ART professionals to assess current practices regarding the use of morphological staining before ART procedures

- **Yes: 122 respondents**
- **No: 8 respondents**
- **Limited only: 27 respondents**

The poll results reveal that the majority of embryologists continue to prioritize morphological staining before proceeding with Assisted Reproductive Technology (ART) procedures. Out of the 157 participants, 122 (approximately 78%) indicated that they still perform morphological staining, 8 (about 5%) do not, and 27 (around 17%) limit the use of morphological staining.

Key Insights

Strong Preference for Morphological Staining: The overwhelming majority of 122 respondents who regularlyperform morphological staining highlights the importance placed on assessing sperm morphology before ART. This practice reflects the recognition of how critical sperm morphology is in ensuring the selection of sperm with the best potential for successful fertilization and healthy embryo development.

Limited Use Among Some Practitioners: The 27 participants who limit their use of morphological staining might do so based on specific criteria, such as the quality of the semen sample or previous outcomes. This approach could indicate a trend towards more targeted use of staining, where it's employed only when sperm morphology is of particular concern, rather than as a routine part of every procedure.

2. A poll was conducted to explore the preferences of embryologists and ART specialists for their preference if ICSI or cIVF when handling teratozoospermia samples with excellent rapid progressive motility.

- **Conventional IVF: 4 respondents**
- **ICSI: 72 respondents**

The poll results reveal a strong preference for Intracytoplasmic Sperm Injection (ICSI) over conventional In Vitro Fertilization (IVF) when dealing with teratozoospermia, even when the sperm sample exhibits excellent rapid progressive motility. Out of the 76 respondents, 72 (approximately 95%) chose ICSI, while only 4 (about 5%) opted for conventional IVF.

Key Insights

ICSI as the Preferred Method: The overwhelming preference for ICSI among 95% of respondents underscores the importance of ensuring precise sperm selection in cases of teratozoospermia, despite good motility. This choice reflects the ongoing concern about the genetic and structural integrity of sperm in teratozoospermic samples. Even with high motility, abnormal morphology might still pose risks to fertilization and embryo development, leading practitioners to favor ICSI for better control over sperm selection.

3. A poll was conducted to explore the preference of embryologist in case of absolute asthenozoospermia.

Theophylline: 7
HOS ICSI: 4
Tail flexibility: 3

Key Insights:

Theophylline is the most preferred option among embryologists for dealing with absolute asthenospermia, suggesting that it is viewed as a highly effective solution for enhancing sperm motility and improving fertilization outcomes**.**

HOS ICSI is also a valued technique but is less favored compared to Theophylline. It is likely considered useful, particularly when motility is severely compromised, but may not be the first choice for all cases.

Tail Flexibility is less popular, indicating that it might not be as effective or practical as Theophylline and HOS ICSI in addressing severe sperm motility issues.

EMBRYO CHAT- DISCUSSION SUMMARY

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1. Importance of Sperm Morphology

Sperm morphology refers to the size and shape of sperm, which are critical factors in assessing male fertility. Morphologically normal sperm are more likely to have intact genetic material and structural integrity necessary for successful fertilization. Selecting sperm with normal morphology during ICSI is crucial because:

- Genetic Integrity: Sperm with normal morphology are less likely to carry genetic abnormalities. This reduces the risk of transmitting genetic defects to the embryo.
- Embryo Quality: The quality of the embryo is significantly influenced by the morphology of the sperm. Abnormal sperm morphology can lead to poor fertilization rates, impaired embryo development, and lower implantation success.

2. Magnification and Sperm Selection in ICSI

During ICSI, sperm selection is typically performed under high magnification. The standard magnification used for sperm selection is:

- Magnification Levels: Most embryologists prefer using a 40x objective lens, combined with a 10x eyepiece, resulting in 400x magnification. This level allows detailed observation of the sperm's head, midpiece, and tail, facilitating the selection of the most morphologically normal sperm.

3. Handling TESA Samples

- For sperm retrieved via Testicular Sperm Aspiration (TESA), morphology and genetic integrity remain paramount. Even though TESA-derived sperm might have structural abnormalities, selecting the most normal-looking sperm helps minimize the risk of passing on genetic defects.

TESA (Testicular Sperm Aspiration) can be performed on the same day as Oocyte Pickup (OPU).

If sperm is found, the following options are available:

1. ICSI for All Oocytes: Proceed with ICSI for all oocytes using the TESA sample.
2. ICSI for All Oocytes and Freeze Remaining TESA Sample: Use the TESA sample for ICSI and freeze any remaining sperm for future use.
3. Split ICSI with TESA and Donor Sample: If the patient cannot afford another stimulation cycle, split the oocytes, using both the TESA sample and donor sperm**may be offered** (In case, a poor outcome is suspected with TESA/TESE sperms; or if the number of sperms found in the TESA/TESE sample is not enough vs the number of mature eggs; and/or if the couple wishes to opt for the donated sperms, some oocytes may be injected with the

donated sperms. A thorough counseling must be offered and an informed consent must be obtained to the couple before this option.)

If no sperm is found during TESA:

1. ICSI with Donor Sperm: Proceed with ICSI using donor sperm.
2. Freeze Oocytes and Plan for SSR Later: Freeze the oocytes and plan for Sperm Retrieval Surgery (SSR) later, which could include microTESE.

TESA Sperm Freezing and Thawing: The survival rates of frozen-thawed TESA sperm can be an issue. Proper documentation is crucial to assess the number of live sperm observed, whether through spontaneous motility, the Hypo-osmotic Swelling (HoS) test, or induced motility with theophylline. This documentation aids in patient counseling and helps anticipate the likely outcomes, though exact predictions are challenging.

Cytoplasmic Droplets: These are often observed in TESA samples. Embryologists should avoid selecting sperm with significant cytoplasmic droplets, as these may indicate immature or compromised sperm.

4. Staining Techniques for Sperm Morphology

Staining is a vital step in assessing sperm morphology. Common staining methods include:

- Diff-Quik Stain: Widely used due to its convenience and quick application. Pre-stained slides are also available, saving time and ensuring consistent results.
- Papanicolaou Stain: Recommended by WHO, though less commonly used in some laboratories due to its more time-consuming process.

5. Advanced Sperm Selection Techniques

- In cases of severe sperm abnormalities, advanced sperm selection techniques may be employed:
- IMSI (Intracytoplasmic Morphologically Selected Sperm Injection): Uses higher magnification (up to 6000x) to select sperm with the best morphology.
- PICSI (Physiological ICSI): Selects sperm based on their ability to bind to hyaluronic acid, mimicking natural fertilization conditions.
- Laser-Assisted Sperm Selection: Some participants discuss using laser technology to help select viable sperms by targeting the tail. If the sperm reacts (e.g., tail curling), it indicates it is alive, whereas no reaction suggests it's dead.

  There is some scepticism about the effectiveness of these methods, and the group asks for detailed technical settings (e.g., laser power, pulse duration) to optimize the procedure.

6. Addressing Challenges in Sperm Morphology

- Challenges such as complete teratozoospermia (where nearly all sperms are abnormally shaped) require careful consideration:
- Patient Counseling: Couples should be counseled about the possible outcomes and the potential need for donor sperm.
- Antioxidant Therapy: A course of antioxidants may be recommended to improve sperm

quality before attempting ICSI.

- Genetic Counseling: For cases with high DNA fragmentation or other genetic concerns, genetic counseling and testing might be advisable.
- Curled tail sperms in donor samples: Several participants reported noticing many donor sperm samples with curled tail sperms. This issue seems to be more common in frozen samples and could be related to the freezing and thawing process.

  Improper freezing techniques or the freezing media used. Some suggest that the freezing process, if not done carefully (e.g., adding the freezing media too quickly), can lead to such abnormalities.

  The discussion hints at uncertainty regarding the outcome of using these curled tail sperms. There are concerns about whether such abnormalities affect fertility outcomes like embryo quality or pregnancy rates.
- Selection Criteria: When it comes to selecting sperm for ICSI, there is a focus on both motility and morphology, though there's an acknowledgment that in some cases, motility might take precedence.

7. Morphological Abnormalities (MMAF) and IVF/ICSI Outcomes

MMAF, a condition where sperm have multiple structural defects in the tail, making them immotile. This is linked to genetic disorders like Primary Ciliary Dyskinesia (PCD).There is a suggestion that genetic testing might be necessary before ICSI to prevent passing on the disorder.

Some participants argue that despite morphological abnormalities, good outcomes can still be achieved with ICSI. However, others report higher rates of miscarriage or other complications.

8. Considerations for Indian Populations

It has been observed that sperm morphology standards developed by WHO might not be fully applied to the Indian population due to genetic differences. This raises the question of whether region-specific guidelines should be developed to better assess and manage male fertility in India.

9. Incubation Conditions

The discussion touches on the use of specific incubators likeBox type or CO2 only for culturing embryos, especially for those that show slow growth. The choice of incubator can impact embryo development outcomes.

10. Practical Considerations

- **Trial TESA**: Performing a trial TESA before the oocyte retrieval (OPU) day can help in planning, ensuring that viable sperm are available, and counselling the patient on the potential need for donor sperm if no viable sperm are found.
- **Sperm Mobilization**: The use of compounds like Theophylline (found in Sperm Mobil) is recommended to enhance sperm motility before ICSI, especially in cases with cryopreserved samples.

Conclusion:

Overall, the discussion is a mix of clinical insights, technical advice, and open-ended questions about best practices in handling and selecting sperm for assisted reproductive technologies (ART). The participants are trying to navigate the complexities of sperm morphology and its impact on fertility treatments, sharing their experiences and seeking advice from others in the field. Sperm morphology plays a crucial role in the success of ICSI, influencing both fertilization rates and embryo quality as shared by majority of respondents while a few reported to have achieved good quality embryo despite morphological abnormalities. The careful selection of sperm, combined with advanced techniques and region-specific guidelines, can optimize outcomes in assisted reproductive technologies.

For further reading

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