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Impact of Sperm Morphology on Rate of Pregnancy after doing Intrauterine Insemination (IUI)

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Abstract:

Understanding of the pregnancy rates (PRs) between patients undergoing IUI cycle with strict sperm morphology (SSM) <4% than compared with $\geq 4\%$ on initial semen analysis, along with other normal parameters. Also to understand whether this study is either helpful or not for IUI cycles with SSM <4%. And to determine the relationships between IUI success rates and the level of morphologically normal sperm, evaluated using this SSM in the raw semen sample. Even this study is useful in the judgement of the selection of patients, for their semen samples preparation, including sperm morphology, sperm concentration, and percentage of motile sperm in raw and post washed semen, vitality, statistical analysis.

Keywords: Intrauterine Insemination (IUI), Strict Sperm Morphology (SSM), Pregnancy Rate (PR).

1. Introduction:

Infertility has become an ominous problem. More than 70 million couples suffer from infertility problem or childlessness [1]. Majority are the residents of developing countries such as India and Southeast Asia compared with Western Societies are suffering from infertility due to lack of preventive measure, education, inappropriate diagnosis, treatment and poverty etc. Infertility is defined as the biological inability to achieve conception in a period of one year in a couple, despite regular and unprotected sexual intercourse. A male infertility is that if the male partner is unable to impregnate his female partner after one year of unprotected intercourse. According to WHO Task Force diagnosis, 15% of population or 15% of couples are affected by primary or secondary infertility and among them 40-50% are due to the male infertility [1,2]. Even, infertility impacts one of the every six couples attempting pregnancy (Chandra A et al., 2005). The male partner contributes in 30%–50% of infertility cases and is the sole factor in up to 20% [2,3]. Mainly,

male infertility with no sperm in semen is categorised as Azoospermia [such as Obstructive and Non-Obstructive Azoospermia], Oligozoospermia or Oligospermia (decreased number of spermatozoa in semen), Hypospermia (reduced seminal volume), Teratospermia (increase in sperm with abnormal morphology), Asthenozoospermia (reduced sperm motility), Necrozoospermia (all sperm in the ejaculate are dead), Leucospermia (a high level of white blood cells in semen), Normozoospermia or Normospermia (as per WHO 2010, analysis, normal values of all ejaculate parameters but still there are chances of being infertile) and Coital infertility (due to erectile dysfunction and ejaculatory failure). So many different factors like chemical, physiological, environmental factors create adverse effects on sperm morphology, motility and sperm count. Many studies have supported that different factors such as varicocele, testicular failure, endocrine dysfunction, genital tract infection, testicular disturbances, testicular cancer, hormonal disturbances, retrograde ejaculation, prolonged exposure to heat, immune infertility or anti-sperm antibodies (ASA), chromosomal anomalies like Klinefelter Syndrome, Y chromosome deletions, DNA fragmentation, DNA methylation, obesity, older age, tobacco smoking, alcohol, heavy metals, pesticides, oxidative stress, genetic factors, environmental and nutritional factors etc. reversibly or irreversibly influence male infertility[4-7].

Semen analysis is used to evaluate male fertility potential and it includes sperm concentration, sperm morphology, sperm motility and vitality. In 1986, Kruger et al. described sperm morphology, termed Kruger/Tygerberg strict sperm morphology (SSM) for successful fertilization after addition of sperm and retrieved oocytes in culture condition through ovum pickup as a part of IVF (Kruger TF et al., 1986). Before proceeding to IVF, some alternative treatment options are offered because of high cost and invasiveness. Usually ovulation induction with IUI is used to achieve the bypass of the cervical mucus barrier and to increase the gamete density at the site of fertilization [3-6]. At present, this study refers to determine the difference in ongoing pregnancy rates (PRs) between patients undergoing IUI with strict sperm morphology (SSM) <4% compared with $\geq 4\%$ on initial semen analysis with otherwise normal parameters and this study is also helpful whether or not IUI cycles could be recommended with SSM <4%.

2. Methods & Outcome:

2.1. Diagnosis:

The diagnosis is important for an infertile patient to give him the pleasure to become a father. It's started with a medical history and physical examination by the doctors, nurse, or expertise personnel. The provider may order blood tests to look for hormone imbalances, medical conditions, or genetic issues.

2.2. Medical history determination and physical examination:

The history includes, 1. earlier testicular or penile affront (torsion, cryptorchidism, injury), contaminations (mumps orchitis, epididymitis), ecological elements, over the top warmth, radiation, prescriptions, and medication use (anabolic steroids, liquor, smoking). 2. Sexual propensities, recurrence and timing of intercourse, utilization of ointments, and each accomplice's past fruitfulness encounters are significant. 3. Loss of moxie and cerebral pains or visual aggravations may demonstrate a pituitary tumor. 4. The past clinical or careful history may uncover thyroid or liver malady (anomalies of spermatogenesis), diabetic neuropathy (retrograde discharge), radical pelvic or retroperitoneal medical procedure (missing fundamental emanation optional to thoughtful nerve injury), or hernia fix (harm to the vas deferens or testicular blood supply). 5. A family ancestry may uncover hereditary issues. 6. At that point the physical assessment is experienced the assessment of the penis, scrotum, gonads, vas deferens, spermatic lines, ejaculatory pipes, urethra, urinary bladder, butt and rectum. An orchidometer can gauge testicular volume, which thus is firmly connected with both sperm and hormonal parameters [4-6].

2.3. Semen Sample Collection:

Typically, semen test is gathered after spermogram. The ideal sexual forbearance for

semen test getting is of 3–5 days. The main method to get the semen test is through masturbation, and the best spot to acquire it is in a similar facility, as along these lines temperature changes during transport can be maintained a strategic distance from, which can be deadly for some spermatozoa. A solitary semen test isn't deciding for infection determination, so two distinct examples must be broke down with an interim between them of seven days to a quarter of a year, as sperm creation is a cyclic procedure. To get the example, a clean plastic compartment is utilized and after assortment of the semen it ought to be analyzed inside 60 minutes. Customary additives ought to be kept away from, as they have synthetic substances, for example, oils or spermicides that could harm the example [6-8].

If there should be an occurrence of paraplegia it is conceivable to utilize technician devices or electro-discharge. The example ought to never be gotten through copulation hinders for a few reasons: Some piece of discharge could be lost or Bacterial tainting could occur or the acidic vaginal pH could be harmful for sperm motility. Most significant factor is to name the semen test effectively with the patient recognizable proof, date, hour, forbearance days, among other information required to be known. The volume of the semen test, rough number of complete sperm cells, sperm motility and level of sperm

with typical morphology are to be estimated by WHO 2010 rules [7-9].

2.4. Selection of patients:

To do this study a total 100 couples (consisting of 50 couples having sperm morphology $\leq 4\%$ and another 50 of couples having sperm morphology $< 4\%$) are selected for IUI with male or female factor infertility. Before IUI, the couples experience standard ripeness workup alongside clinical history assurance and documentation of a typical physical assessment including bosom and pelvic assessment inside a year, Papanicolaou smear and routine wellbeing screening assessments (e.g., mammograms) and so forth. Testing incorporates a hysterosalpingogram, assessment of ovarian hold with at least day 3 FSH, day 3 E2, TSH, PRL, blood classification, counter acting agent screen, total blood check and affirmation of rubella and varicella insusceptibility. Diagnoses included in the study where male factor infertility, anovulation, endometriosis, tubal and uterine factors, decreased ovarian reserve and recurrent pregnancy loss. Male factor infertility consists either one or more abnormal semen analysis parameter(s) or disorders of male sexual function. According to the definition of normal semen analysis parameters followed the WHO 5th edition (2010) of sperm parameters (normal concentration of 20 million sperm/ml and normal motility of 50%). If all semen analysis parameters are normal then it is not for the male

factor infertility but rather female factor infertility (WHO lab. Manual 5th, 2010). Cycles are included by our analysis if they have a post-wash total motile count of at least 5 million sperm/ml, female age between 22 and 35 years, male age between 25 and 45 years and documentation of pregnancy outcome in our electronic medical record defined by fetal cardiac activity confirmed between 7 and 8 weeks of gestational age based on the date of the insemination by using trans vaginal ultrasound. Also cycles, those are having a total motile count of < 5 million sperm/ml or less will be excluded [6-8].

Patients undergo natural cycle insemination or ovulation induction using variable doses of clomiphene citrate (CC), letrozole, or gonadotropins, and used hCG (r hCG or u hCG) for releasing of the oocytes. hCG is administered when the lead follicle is at least 18 mm in average diameter as measured in two planes by transvaginal ultrasound and insemination is performed between 24 and 36 hours after injection.

3. Preparation of sperm samples:

Sperm for insemination during IUI will be prepared according to the WHO manual 5th edition, 2010. After the semen analysis following WHO 2010 strict criteria the semen samples will be prepared depending upon the count and other parameters.

The sample parameters will be recorded along with patient details and also cycle information including age, morphology, total motile count, history of prior pregnancy, urologic evaluation (whether completed or not), female infertility diagnosis, male infertility diagnosis, the method of ovulation induction if used, as well as use of hCG during the cycle using electronic medical record [7-9].

4. Conclusion:

The present work will provide predictive outcome and to determine the relationship between sperm morphology and the rate of pregnancy after doing Intrauterine Insemination (IUI). Also depending upon the sperm morphology we can easily categorise patients ART methods, and also counsel them whether they should go for IUI process or IVF process to get positive live birth.

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