Scientific Update: The relationship between sperm motility and morphology

The following table reference studies providing evidence of the positive correlation between sperm motility and morphology:

Name of Publication	Text Summary	Publication Details
Reevaluation of the clinical importance of evaluating sperm morphology using strict criteria.	Table 1: shows positive correlation between the increase in % normal morphology and the increased content of motile sperm (page 2 of the article).	Check et al, Arch Androl. 2002 Jan-Feb;48(1):1-3.
Relation of the Morphological Alterations of Spermatozoa with Motility.	Morphological abnormalities of neck, midpiece and tail were significantly associated with impaired sperm motility.	Aydos et al, 2000 ARTEMIS (Journal of the Turkish-German Gynecological Association) Vol. 1 p. 5-8. http://www.artemisonline.net/ volume/volume1/pdf/spermatozoa.pdf
Effect of sperm morphology and motile sperm count on outcome of intrauterine insemination in oligozoospermia and/or asthenozoospermia.	Influence of seminal and other parameters on outcome of IUI was assessed by discriminant analysis, and a significant correlation with pregnancy rate was found for motile sperm count and sperm morphology.	Francavilla et al, Fertil Steril. 1990 May;53(5):892-7. p. 3.
Correlation between semen parameters of electro ejaculates and achieving pregnancy by intrauterine insemination.	The total motile sperm count and percentage of normal morphology were significantly higher in the specimens that resulted in pregnancies than those that did not.	Chung et al, Fertil Steril. 1997 Jan;67(1):129-32. p. 4.
The semen of fertile men. II. Semen characteristics of 100 fertile men.	A positive relationship between the different variables, sperm density, and sperm mobility, as well as between the 2 variables of sperm motility and sperm morphology to the other variables was confirmed.	Sobrero & Rehan, Fertil Steril. 1975 Nov;26(11):1048-56. p. 5-6.
Seasonal changes in results of semen analysis from male members of an infertile married couple	The increase of the percentage of pathological forms correlates with decreased motility.	Swatowski et al, Ginekol Pol. 1994 Jan;65(1):29-34. p. 7.

Reference abstracts:

Arch Androl. 2002 Jan-Feb;48(1):1-3.
Reevaluation of the clinical importance of evaluating sperm morphology using strict criteria.
Check ML, Bollendorf A, Check JH, Katsoff D.
University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School at Camden, Cooper Hospital/University Medical Center, Department of Obstetrics and Gynecology, USA.

Several studies suggest that sperm with < or =4% normal morphology (NM) using strict criteria are sub fertile and IVF with ICSI may be needed. However, not all studies agree on the clinical importance of the use of NM with strict criteria. One study of males with oligozoospermia found a lower pregnancy rate (PR) following intercourse with sperm with NM > 14% compared to specimen with < or = 4%. The study presented herein evaluated the efficacy of intrauterine insemination (IUI) according to NM using strict criteria. The clinical PRs for first IUI cycles were 30% (28/91) for 0-4% normal forms, 26% (71/268) for range of 5-14%, and 20% (11/53) for >14%. This study corroborates previous data with intercourse only, suggesting that sperm with NM < or =4%, using strict criteria are not necessarily associated with lower fecundity.

* In the text of Table1. Mean total motile sperm used for IUI according to strict criteria shows a positive correlation between % normal morphology and motility of sperm cells.

Fertil Steril. 1990 May;53(5):892-7.
Effect of sperm morphology and motile sperm count on outcome of intrauterine insemination in oligozoospermia and/or asthenozoospermia.
Francavilla F, Romano R, Santucci R, Poccia G.
Department of Internal Medicine, University of L'Aquila, Medical School, Italy.

Eighty-six couples with long-standing infertility and poor post-coital test, due to oligozoospermia and/or asthenozoospermia (68 cases) or mucus hostility (18 cases), were treated by 411 intrauterine inseminations (IUI) with motile sperm suspensions from the husband's semen. The pregnancy rate per couple in the group with abnormal semen was lower than in the group with mucus hostility (22% versus 38.9%). Influence of seminal and other parameters on outcome of IUI was assessed by discriminant analysis, and a significant correlation with pregnancy rate was found for motile sperm count and sperm morphology. Teratozoospermia (normal morphology less than 50%) affected the outcome of IUI both when associated with moderate oligozoospermia and/or asthenozoospermia (motile sperm count greater than or equal to 5 X 10(6)/mL) (success rate per couple: 11.1%), and, even more, when associated with severe oligozoospermia and/or asthenozoospermia (motile sperm count less than 5 X 10(6)/mL), where no pregnancy was achieved. In the absence of teratozoospermia, the success rate per couple both in severe and in moderate oligozoospermia and/or asthenozoospermia had similar results (33.3% versus 35.7%). In conclusion, the absence of teratozoospermia appears to be an effective criterion for selecting couples with infertility due to oligozoospermia and/or asthenozoospermia who may benefit from IUI.

Publication Types: Clinical Trial PMID: 2185044 [PubMed - indexed for MEDLINE]

Fertil Steril. 1997 Jan;67(1):129-32.
Correlation between semen parameters of electro ejaculates and achieving pregnancy by intrauterine insemination.
Chung PH, Verkauf BS, Mola R, Skinner L, Eichberg RD, Maroulis GB.
Department of Obstetrics and Gynecology, University of South Florida College of Medicine, Tampa, USA.

OBJECTIVE: To investigate whether any parameter in the routine semen analysis of electroejaculates is correlated with success in achieving pregnancy by IUI. DESIGN: Retrospective observational study. SETTING: An Assisted Reproductive Program at a tertiary care university center. PATIENT(S): Twenty-seven anejaculatory men with spinal cord injury (n = 24) or history of retroperitoneal lymph node dissection (n = 3), thirteen of whom attempted conception with their wives. INTERVENTION(S): Anejaculatory men underwent rectal probe electro ejaculation and electro ejaculates were used for IUI. MAIN OUTCOME MEASURE(S): Statistical correlation of semen parameters between electro

ejaculates that resulted in pregnancy and those that did not. RESULT(S): Seven pregnancies resulted from 56 IUIs using electro ejaculates (pregnancy rate = 12.5% per IUI). The total motile sperm count and percentage of normal morphology were significantly higher in the specimens that resulted in pregnancies than those that did not. However, there was no statistically significant difference observed in pH, sperm concentration, or percentage of motility between the two groups. Swim-up techniques used to process electro ejaculates significantly improved the motility of the specimens. No pregnancy occurred beyond the fifth IUI attempt. Repeated electro ejaculation and duration of spinal cord injury had no effect on the quality of the ejaculates. CONCLUSION(S): The total motile sperm count and the percentage normal morphology of electro ejaculates correlate with success in achieving pregnancy by IUI. Because repeated electro ejaculation does not improve quality of ejaculate, the initial semen analysis of electro ejaculates is not only useful in counseling couples undergoing such treatment program but should be planned for use as an inseminate.

PMID: 8986697 [PubMed - indexed for MEDLINE]

Fertil Steril. 1975 Nov;26(11):1048-56.

The semen of fertile men. II. Semen characteristics of 100 fertile men.

Sobrero AJ, Rehan NE.

From a population of men applying for voluntary sterilization, 100 consecutive cases were selected according to the following criteria: (1) each man had fathered at least two children; (2) at the time of the request for a vasectomy the man's wife was pregnant; and (3) a complete prevasectomy semen analysis, including sperm morphology, was available. The usual parameters of human semen evaluation are reported: the mean volume of the ejaculates was 3.3 ml +/- 0.84 SD (range, 0.5 to 11 ml); the mean sperm density was 81 million/ml +/- 57 SD (range, 4 to 318); while the geometric mean, which according to the sample distribution is more representative, was 68. The mean percentage of motile sperm was 63% +/- 16 SD (range, 10 to 95%); the grade of forward progression was 3 +/- 0.55 SD (range, 2 to 4); and for sperm morphology the mean number of sperm with oval heads was 75% +/- 6 SD (range, 21 to 90%). Statistical comparison of these findings with those of our previous study of the semen of 1300 fertile men revealed complete agreement; minor statistical differences, on single parameters, with three similar studies are indicated. A positive relationship between the different variables, sperm density and sperm motility (in percentage of motile sperm and degree of forward motion), as well as between the two variables of sperm motility and sperm morphology to the other variables was confirmed.

PIP: In a previous report the characteristics of 1300 consecutive prevasectomy semen specimens of men who had fathered 2 or more children were analyzed. From the same population a group of subjects was selected whose wives were pregnant at the time of the semen analysis. From the files of the Vasectomy Service at the Margaret Sanger Research Bureau, Inc. in New York City, 100 consecutive men whose prevasectomy semen analysis reports fulfilled the following criteria were selected: the man had fathered 2 or more children and his wife was again pregnant at the time of the prevasectomy semen analysis; and the prevasectomy semen analysis was complete, including the evaluation of morphology. Each prevasectomy semen specimen was collected by masturbation. The analyses were made within 90 minutes-3 hours postejaculation. Study results are reported in terms of volume, sperm density, motility, sperm morphology, and semen quality and age. The volume of the ejaculate in the population studied ranged from 0.6-11 ml. The mean volume for these 100 fertile men was 3.31 ml +or- 1.84 SD. The sperm density, or count per milliliter, ranged from 4-318 million. The mean value for these 100 men was 81 million +or- 57 SD. The geometric mean, which is considered to be more accurate, was 68 million. The percentage of active sperm cells ranged from 10-95. The mean number of active cells was 63% +or- 16 SD, with the greatest proportion (70%) in the group having 40-80% motility. The quality of sperm motility was graded according to MacLeod's system of estimating grade of activity and forward motion from 0, or total immobility, to 4. In the 100 semen specimens the quality of sperm motility ranged from grade 2-4. In these 100 specimens the percentage of sperm with oval heads ranged from 21-29; the mean was 73% +or- 6 SD. There was no sound basis for stating whether any difference between different groups was due to the difference in age or whether it merely reflected individual situations, as is most likely the case. The findings are compared to the investigations of MacLeod, MacLeod and Gold, and Falk and Kaufman. A positive relationship between the different variables, sperm density, and sperm mobility, as well as between the 2 variables of sperm motility and sperm morphology to the other variables was confirmed.

PMID: 1183628 [PubMed - indexed for MEDLINE]

Ginekol Pol. 1994 Jan;65(1):29-34.

Seasonal changes in results of semen analysis from male members of an infertile married couple.

Swatowski D, Robak-Cholubek D, Bakalczuk S, Jakiel G, Osinska-Stepien J, Przytula-Pilat M.
Kliniki Rozrodczosci z Andrologia Akademii Medycznej, Lublinie.

Analysis of 200 semen samples of men from childless couples was performed in order to evaluate the sperm characteristics during the year. Estimated were following features: semen volume, sperm density, motility and percentage of pathological forms. The sperm estimation data obtained from 4 seasons of the year was statistically evaluated. Statistically significant changes were found only in the percentage of pathological sperm forms. During the spring period the observed values were significantly higher than during summer and winter. From the correlation tables it appears that together with the increase of sperm density the percentage of pathological forms decreases. Whereas increase in density is correlated with the increase of sperm motility. It was also revealed that together with the increase of the percentage of pathological forms the motility decreases. Analogical results were obtained in all seasons of the year which indicates that there is a clear regularity existing. The least apparent dependencies were found in winter period.

PMID: 8070701 [PubMed - indexed for MEDLINE]