

COMPUTER ASSISTED SEMEN ANALYSIS NOT SUPERIOR TO ROUTINE ANALYSIS IN DISTINGUISHING FERTILE FROM SUBFERTILE MEN

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The ability of the semen analysis either by routine methods (RSA) or computer-assisted means (CSA) to predict male infertility was evaluated by determining the pregnancy rates during an 8-month span in a large group of infertile couples where a female fertility factor was identified and presumably corrected. The males were untreated. Not only was CSA less effective than RSA in predicting a male infertility factor, but also neither CSA or RSA seemed capable of identifying infertility unless severely abnormal. It would appear that there is definite need to find more accurate methods of evaluating the spermiogram.

Key Words: Spermatozoa; Motility; Infertility; Computer; CASA.

INTRODUCTION

Men with subnormal spermiograms have, on occasion, achieved pregnancies. Furthermore, men with subnormal semen parameters, as defined by the World Health Organization (WHO), have successfully fertilized their wives following various therapies (e.g., varicocelectomy [1, 4]) or following medical treatment (e.g., clomiphene citrate [2, 5]). However, some of the "failures" these men experience in achieving pregnancies may be related to a failure to identify and correct any existing occult female factor. In fact, in 1977 Check and Rakoff indicated that the reason for their 90% pregnancy rate as compared to only 23% reported by Paulson and Wacksman [5], despite similar improvement of the spermiogram in both studies following clomiphene citrate therapy of the males, was probably attributable to meticulously correcting the female factors (all 10 wives had an associated infertility problem requiring treatment) [3].

Conversely, the "success" of some of these "male therapies" might have been related primarily to having corrected a female infertility factor and had no bearing at all on the sperm treatment. For these reasons, a study was initiated to evaluate the fertility outcome during an 8-month span in infertile couples where a female factor had been identified and was believed

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to be fully corrected. The intention was to evaluate the spermogram initially but withhold any therapy for the 8 months even if the spermogram was subnormal. Furthermore, the spermogram would be measured by both computer-assisted and manual methods to find out if the former offers any advantage over the latter.

MATERIALS AND METHODS

A total of 216 couples were enlisted for the study in which all infertility factors identified in the wife were believed to be fully corrected (e.g., a luteal phase defect corrected by progesterone therapy and resulting in a normal biopsy; or anovulation with restoration of ovulation by bromocriptine (if hyperprolactinemia existed), clomiphene citrate or human menopausal gonadotrophins (hMG); or a cervical factor treated with guaifenesin or estrogen and demonstrated by sperm with progressive forward motion (PFM) in the mucus).

The semen was initially evaluated twice at 3–5 week intervals and then averaged. In the first group of 155 couples, the semen analysis was performed by the manual method only, employing the Makler Chamber for count and motility. The quality of motility and sperm morphology was directly assessed using the phase contrast microscope. This group of tests are known as routine semen analysis (RSA). In an additional 61 couples, semen was evaluated by CellSoft (Cryo Resources, Ltd., New York) for a computerized semen analysis (CSA). This group of parameters for CSA included: computerized measurements of velocity, linearity, lateral head displacement (both ALH max and ALH mean), and beat/cross frequency. This allowed evaluation and comparison of the new motility parameters with RSA.

Again, the norms (parameter of "normal" males) for RSA are values suggested by the World Health Organization. The norms for CSA were established by the minimum value achieved by donor sperm. Values correlate with suggested reference points obtained from Cryo Resources for use with the CellSoft semen analyzer (Table 1). Patients with a sperm concentration of less than 5 mill/ml were excluded from this study.

Quality of motility by RSA was judged on a scoring system of 1 to 4. The specimen was considered to be of subnormal quality if its grade was 1 or 2.

Grade 1—Minimal forward progression

Grade 2—Poor to fair motility

Grade 3—Good activity with linear forward progression

Grade 4—Full activity with both fast and linear forward progression

RESULTS

In 155 couples where the husband was evaluated only by RSA and an additional 61 couples were evaluated by RSA and CSA, 81 of 216 men (38%) had subnormal RSA versus 40 of 61 men (66%) having a subnormal CSA. In the group of 155 patients, pregnancies were achieved in 30 of 48 couples (63%) with a subnormal RSA. Overall, 167 of 216 couples (77%) achieved pregnancies (Table 2).

The pregnancy rate in the 61 patients evaluated by both CSA and RSA was as follows: pregnancies were achieved in 9 of 11 (82%) of the women with husbands with subnormal RSA but normal CSA, in 15 of 18 (83%) men with subnormal CSA but normal RSA, in 15 of 22 (68%) with both RSA and CSA subnormal, and 7 in 10 (70%) with normal RSA and CSA (Table 2). The percent motility was subnormal (less than 50%) in 59 of 216 patients (27%), and pregnancies were achieved in 41 of 59 (69%) compared to 126 of 157 (80%), where the motility was judged normal.

TABLE 1 Normal Values for Routine (RSA) and Computerized (CSA) Semen Analysis

	Normal values
Count	≥ 20 mill/ml
Motility	$\geq 50\%$
Morphology	$\geq 50\%$ normal forms
Velocity	$\geq 40,000$ mic/sec
Linearity	≥ 5.5
ALH mean	≥ 1.80 mic
ALH max	≥ 2.30 mic
Beat/cross frequency	≥ 13.00 Hz (1/sec)

When the data were analyzed using multiple abnormal parameters, a lower percentage of patients were found with two or more abnormal parameters in the pregnant group, 28 out of 46 or 61%, versus 12 out of 15 or 80% in the group not pregnant. Only when multiple parameters are abnormal—especially count, motility, velocity and linearity—can the fertility potential be predetermined as impaired.

DISCUSSION

These data suggest that neither the RSA or CSA accurately predicts fertility potential in men. There were no differences in the pregnancy rates of the wives who had husbands with normal or subnormal semen analysis. A previous study did suggest that a greater number of subnormal men could be identified by CSA (80%) than by RSA (50%) [6]. However, our data suggests that it is erroneous to assume that any substandard semen parameter found in the husband of an infertile couple implicates the male factor as being etiologic.

The subnormal semen parameters that correlated best with subfertility were velocity and linearity. However, a similar prediction would have been made by evaluating subnormal quality of motility by RSA. Thus, except for possible research purposes, the increased expense of CSA versus RSA do not appear justified under normal clinical circumstances.

Perhaps certain modifications will improve the clinical efficacy of the CSA system, such as

TABLE 2 Pregnancy Rates According to Routine and Computerized Semen Analysis for Parameters (RSA and CSA)

	155 Couples		61 Couples	
	(only RSA performed)		(Both RSA and CSA performed)	
	No. patients	Pregnancy rates	No. patients	Pregnancy rates
RSA only subnormal	48/155 (31%)	(63%)	11/61 (18%)	(82%)
RSA only normal	107/155 (69%)	(85%)		
CSA only subnormal			18/61 (30%)	(83%)
RSA and CSA normal			10/61 (16%)	(70%)
RSA and CSA subnormal			22/61 (36%)	(68%)

the evaluation of motion characteristics in hyperactivated sperm. Thus, there is a need for finding more clinically relevant semen parameters to evaluate (other than oligozoospermia and asthenozoospermia) to help determine when a male factor is contributing to a couple's infertility. Until that time, aggressive therapy of the female partner should be commenced even in the presence of a male factor.

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