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Improved semen quality after a short-interval second ejaculation

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Improved fertility has been reported after the insemination of the better portion of a split ejaculate or by various sperm-concentrating techniques.[1-3] We report a new method of improving the sperm concentration in some men with oligospermia by having them do a second ejaculation 30 to 60 minutes after the first one.

MATERIALS AND METHODS

Forty men with oligospermia were selected in whom the baseline sperm concentration, even with the better portion of a split ejaculate, was $< 20 \times 10^6$/ml. A minimum requirement for motility was 40%, grade 3− out of a possible 4 for quality. The baseline sperm concentration was obtained by averaging the counts of three separate semen samples, after 40 to 72 hours abstinence over a 3-month period. A minimum of 2 years infertility was required for inclusion in the study. The wife had to have normal fertility or at least remediable forms of infertility, e.g., ovulation defects or cervical factor problems.

The 40 patients were divided into two groups of 20 patients each. Group I used the second ejaculate each time, whereas the control subjects (group II) ejaculated only once and used the better portion of the split ejaculate. Each group was composed of four patients with sperm counts between 1 and 5×10^6/ml, six patients between 6 and 10×10^6/ml, and ten patients between 11 and 20×10^6/ml. Each patient in the study group was matched with a control patient in whom no double ejaculate was employed. Each control subject was selected so that the baseline spermiogram with the better portion of the split ejaculate was within 3×10^6/ml (of the better portion of the split ejaculate of the first ejaculated specimen in the double ejaculate group). Quality of motility had to be the same, and the percent of motility had to be within 10% of each other. Ages were matched within 2 years (the average age was 28 years, with a range of 22 to 34 years) and duration of infertility within 4 months, and varicoceles were at least clinically not palpable. Four men in the 1 to 5×10^6/ml category had increased follicle-stimulating hormone levels, and they matched with control subjects with elevated follicle-stimulating hormone plus the other matching criteria. Similarly, only two patients had low serum testosterone levels, and both were matched with each other in study and control groups; and in the other cases each control subject had a testosterone level within 200 ng/ml of the matched double-ejaculate patient.

Twenty of our donors with known normal fertility potential were also asked to perform a double ejaculate; this was compared with their first whole ejaculate performed 30 to 60 minutes earlier.

Inseminations of control subjects and the second ejaculate group were performed two times per cycle, once when the wife's Graafian follicle measured between 18 and 24 mm by pelvic sonography and her serum estradiol was a minimum of 200 pg/ml and then again 36 to 48 hours later. The inseminations were continued monthly for 1

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Table 1. *Second Ejaculate Sperm Counts, Compared with Baseline Ejaculates in Patients with Severe Oligospermia*

	Patient no.																			
	1	2	3	4[a]	5	6	7	8[a]	9	10[a]	11	12	13	14	15	16[a]	17	18[a]	19	20
$\times 10^6$/ml																				
Baseline sperm count[b]	3	1	3	2	6	5	10	9	4	4	11	15	12	16	15	14	16	12	18	16
Second ejaculate count	9	9	25	34	23	20	20	37	32	34	6	5	15	18	39	32	34	43	32	34
Change in count	I[c]	I	I	I	I	I	I	I	I	I	I	D[d]	D	I	I	I	I	I	I	I
	3	8	22	32	17	15	10	28	28	30	5	10	3	2	24	18	18	21	14	18
Baseline total count	3	2	3	3	9	7	13	18	6	4	12	21	19	28	22	20	28	24	26	21
Second ejaculate count	16	7	35	58	37	40	28	43	35	63	9	4	16	28	64	33	45	66	38	52
Change in total sperm count	I	I	I	I	I	I	I	I	I	I	D	D	D		I	I	I	I	I	I
	13	5	32	55	28	33	15	25	29	59	3	17	3	0	42	13	17	42	12	31

[a]Achieved a pregnancy.
[b]Represents better portion of split ejaculate.
[c]I, increased in sperm.
[d]D, decreased in sperm.

year unless a pregnancy was achieved first. The second ejaculate concentration was thus determined by averaging 24 second ejaculates, except in the five patients who impregnated their wives.

RESULTS

The comparison of the average sperm concentration of second-ejaculate specimens, compared with the average baseline sperm concentration of the better portion of a split ejaculate, is seen in Table 1. Fourteen patients showed a better second specimen than first, as defined by at least a doubling in sperm concentration. Four patients showed no significant change, and two patients showed a reduced concentration in the second specimen.

Seven patients had baseline sperm counts of 5 $\times$ 10^6/ml or less. Five of the seven increased the second-ejaculate sperm concentration to a low-normal level of 20 $\times$ 10^6/ml or more, with 60% having normal linear progressive motility. Five of the 20 did not double their second sperm counts, and in 2 of these patients the count actually decreased. Three patients had baseline sperm concentrations between 6 and 10 $\times$ 10^6/ml; all three improved their counts above low normal. Ten patients had baseline sperm concentrations between 11 and 20 $\times$ 10^6/ml. Six of these patients improved their counts to $>$ 30 $\times$ 10^6/ml. Five patients showed an increase in the second-ejaculate sperm concentration over twice the baseline sperm concentration, whereas two patients showed an actual decrease.

The second specimen was superior to the baseline first specimen in only 5 of the 20 donor control subjects. Ten donor control subjects concentrations actually dropped on the second specimen, whereas five remained the same. All donor control specimens had a baseline concentration $>$ 40 $\times$ 10^6/ml, with a minimum motility of 60%, grade 3 of 4 quality. Six donors' concentrations dropped $<$ 40 $\times$ 10^6/ml, but none were $<$ 20 $\times$ 10^6/ml.

The average volume in the 20 patients who performed double ejaculates was 3.6 ml, and the average volume of the second specimen was 1.4 ml.

Five patients impregnated their wives within 1 year, in an average of 6.3 months. In all cases the count had improved to $>$ 20 $\times$ 10^6/ml. The baseline counts in the patients who achieved pregnancies were as follows: 2, 9, 4, 14, and 12 $\times$ 10^6/ml. No patients from the control group impregnated their wives over the 1-year study period (chi-square significant at 0.05). In all five patients who achieved pregnancies, their first ejaculate remained in the same category as when they were initially selected.

DISCUSSION

The results demonstrate that at least in some cases, a man with oligospermia can achieve an improved sperm concentration by performing a second ejaculate 30 to 60 minutes later. The data showed that some men with severe oligospermia, even with the split-ejaculate specimen, were able to improve their sperm concentrations to the low-normal range. Although this phenomenon can occur also in fertile men with normal baseline sperm counts, apparently this occurs in a much lower frequency.

The mechanism of this improvement is not known. Perhaps it may be related to incomplete ejaculation the first time, or perhaps there is increased concentration related to a decrease in seminal fluid related to emptying of the seminal vesicles after the first ejaculate.

Thus, this technique may prove useful as an ancillary technique for use in conjunction with other therapies to help some patients with infertility problems. Often the wife may be on expensive therapy, e.g., human menopausal gonadotropins, because of concomitant ovulation problems, with the need of maintaining the best cervical mucus possible. Frequently, there is disappointment when the wife is at the point of ovulation and the semen sample produced is poor. These data indicate it is worth asking the men to try another specimen; whereas previously, at least in our own practice, we might have given up on that cycle. Naturally, not all men are willing to try this technique; we estimate that one in three are able and willing to produce the specimen.

Although five patients achieved pregnancies, we cannot determine for sure that this might not have occurred if inseminations had been performed with the inferior first specimens. However, none of the control patients in whom the semen counts remained depressed achieved a pregnancy within the 1-year study. The hope is that with a larger patient population, this technique will continue to prove useful as an ancillary procedure for improving male factor infertility.

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