

## Objective

Treatment of clinically palpable varicoceles for infertility has been shown to improve semen parameters and pregnancy rates. However, there is no established definition for “significant improvement” after varicocelectomy. We sought to further investigate the correlation of improvement in semen parameters and pregnancy rates after varicocele ligation (VL), for the purpose of better defining “significant improvement”.

## Design

We performed a retrospective review of all patients undergoing microsurgical sub-inguinal varicocele ligation for infertility between Jan 2006 and April 2016.

All men with clinically palpable varicoceles, >1 year subfertility, at least one abnormal semen parameter, at least one post-operative SA and with at least 12 months postoperative pregnancy data were included in this review.

## Materials/Methods

Exclusion criteria:

- pregnancies conceived within 2 months of surgery
- patients with non-obstructive azoospermia,
- female factor infertility secondary to tubal obstruction.

We defined “significant improvement” as

- ≥50% increase in Total Progressively Motile Sperm Count on postoperative semen analysis.

Patients were divided into two cohorts based on whether they experienced “significant improvement” after VL.

Natural pregnancy rates were then compared between the two cohorts. Statistical significance, defined as a p-value <0.05, was determined using Student’s t-test.

## Results

During this study period 244 patients underwent VL, of which 128 patients met inclusion criteria.

Success after Varicocelectomy			
Demographics	Semen Parameters Improved (n=86)	Semen Parameters Not Improved (n=42)	P-value
Natural Pregnancy Achieved, w/in 12 months	50% (43)	19.0% (8)	<0.01
Age	33	34	0.49
Partner Age	30.25	31	0.22
Follow Up (months)	16	20.3	0.07
Varix Grade	2.14	2.03	0.25
Bilateral	71.0% (61)	69.9% (29)	0.16
Pre Total Progressive Motile Count (x10 <sup>6</sup> )	7.66	10.01	0.43
Post Total Progressive Motile Count (x10 <sup>6</sup> )	23.72	6.81	<0.01

Eighty-four patients (64.1%) experienced significant (≥50%) improvement in Total Progressively Motile Sperm Count after VL.

Patients who experience “significant improvement” after VL had a significantly higher natural pregnancy rate than those who did not (50% vs 19.0%, p<0.01).

Comparing Improved vs Non-Improved Cohorts						
Patient Cohort	Pre Sperm Concentration (million/mL)	Post Sperm Concentration (million/mL)	Pre Progressive Motility (%)	Post Progressive Motility (%)	Pre Total Progressive Motile Count (x10 <sup>6</sup> )	Post Total Progressive Motile Count (x10 <sup>6</sup> )
Improved (n=86)	10.70	*22.22	19.31	*28.61	7.66	*23.72
Not Improved (n=42)	12.99	8.85	22.54	23.60	10.02	8.82
P-value	0.46	<0.01	0.23	0.19	0.43	<0.01

\* Indicates statistically significant (p<0.01) change from preoperative parameter

There was no statistical difference in preoperative semen parameters between those who experienced “significant improvement” after VL and those who did not.

Patients who did not achieve a natural pregnancy had statistically significantly lower pre-op Total Progressively Motile Sperm Count

Comparing Pregnant vs Not Pregnant						
Patient Cohort	Pre Sperm Concentration (million/mL)	Post Sperm Concentration (million/mL)	Pre Progressive Motility (%)	Post Progressive Motility (%)	Pre Total Progressive Motile Count (x10 <sup>6</sup> )	Post Total Progressive Motile Count (x10 <sup>6</sup> )
Pregnant (n=51)	12.21	*20.11	21.18	*31.79	11.63	*26.75
Not Pregnant (n=77)	10.72	16.89	18.69	21.63	5.26	*11.62
P-value	0.54	0.34	0.388	<0.01	0.012	<0.01

\* Indicates statistically significant (p<0.01) change from preoperative parameter

Patients with Improved Semen Parameters						
Patient Cohort	Pre Sperm Concentration (million/mL)	Post Sperm Concentration (million/mL)	Pre Progressive Motility (%)	Post Progressive Motility (%)	Pre Total Progressive Motile Count (x10 <sup>6</sup> )	Post Total Progressive Motile Count (x10 <sup>6</sup> )
Pregnant (n=43)	10.82	*21.58	19.94	*32.09	9.77	*28.65
Not Pregnant (n=43)	10.41	*22.43	17.71	22.54	4.97	*16.81
P-value	0.89	0.85	0.46	0.014	0.078	0.049

\* Indicates statistically significant (p<0.01) change from preoperative parameter

Patients with Non-Improved Semen Parameters						
Patient Cohort	Pre Sperm Concentration (million/mL)	Post Sperm Concentration (million/mL)	Pre Progressive Motility (%)	Post Progressive Motility (%)	Pre Total Progressive Motile Count (x10 <sup>6</sup> )	Post Total Progressive Motile Count (x10 <sup>6</sup> )
Pregnant (n=8)	19.57	12.28	27.83	30.17	21.58	16.65
Not Pregnant (n=34)	9.98	7.81	19.2	20.26	5.85	4.73

P-value not calculated comparing pregnant vs non pregnant parameters  
\* Indicates statistically significant (p<0.01) change from preoperative parameter

## Conclusions

Patients who experience “significant improvement” post VL were found to have a significantly higher pregnancy rate (50% vs 19.0%)

Patients who did not achieve natural pregnancy had significantly lower pre-op Total Progressively Motile Sperm Count (5.26 x10<sup>6</sup> vs 11.6 x10<sup>6</sup>, p=0.012)

Based on these findings, we would consider “significant improvement” post VL as ≥50% increase in total progressively motile sperm.