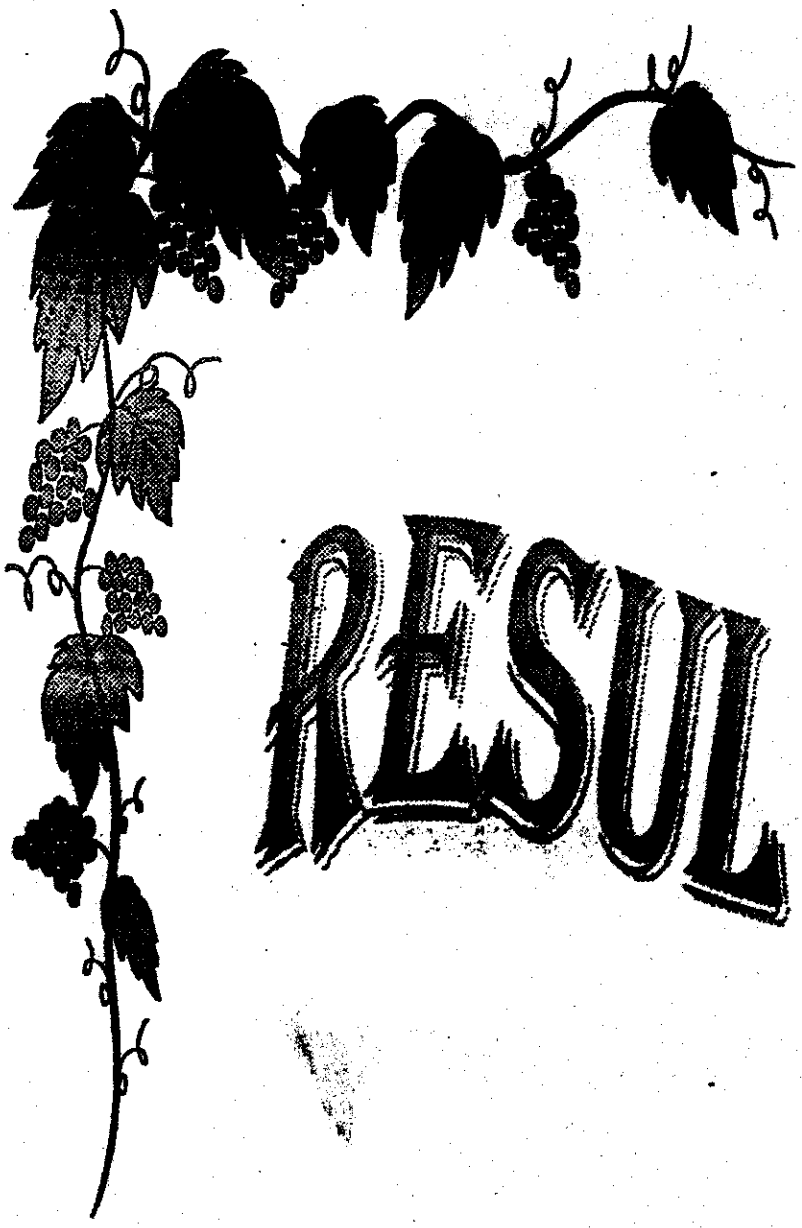
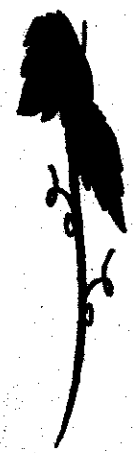


RESULTS



RESULTS

This study included 80 subfertile males suffering from different grades of varicoceles. The patients were randomly divided into two groups :

Group I: Comprised 40 patients who were subjected for laparoscopic varicocele ligation.

Group II : Comprised 40 patients who were subjected for modified Palomo varicocelectomy.

Each group was subdivided into two subgroups :

a) Those with sperm count more than 10 million/ml (30 patients).

b) Those with sperm count less than 10 million/ml (10 patients).

All patients had been followed up at 3 and 6 months postoperatively. Semer analysis was performed on each visit.

The data of this study included the following items and results :

*** Age :**

The age of the patients in group I ranged from 22 to 34 years, with a mean age of 27 ± 2.8 years, while the age of the patients in group II ranged from 23 to 35 years, with a mean age of 27.5 ± 3.04 years. The difference between both groups was statistically insignificant ($P > 0.05$) (Table 1).

Table (1): Shows the mean ages of both groups.

	No.	Age		
		Range	Mean	S.D.
Group I (Laparoscopy).	40	22-34	27	2.80
Group II (M. Palomo)	40	23-35	27.5	3.04
P value	> 0.05 (N.S.)			

S.D. = Standard deviation. *N.S. = Non significant.*
M. Palomo = Modified Palomo.

*** Marital duration :**

The marital duration of the patients in group I ranged from 2 to 6 years, with a mean of 3.1 ± 1.12 years and the marital duration of the patients in group II ranged from 2 to 6 years also, with a mean of 3.2 ± 1.15 years. No significant difference was detected between both groups (P > 0.05) (Table 2).

Table (2): Shows the mean marital duration of both groups.

	No.	Marital duration "years"		
		Range	Mean	S.D.
Group I	40	2-6	3.1	1.12
Group II	40	2-6	3.2	1.15
P value	> 0.05 (N.S.)			

*** Varicocele side :**

28 patients (70%) have a left sided varicocele and 12 patients (30%) have bilateral varicoceles in group I , while 30 patients (75%) have a left sided varicocele and 10 patients (25%) have bilateral varicoceles in group II. The difference between both groups was statistically insignificant (P > 0.05) (Table 3).

Table (3): Shows the varicocele side of both groups.

	Left		*Bilateral*		*Total*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Group I	*28*	*70*	*12*	*30*	*40*	*100*
Group II	*30*	*75*	*10*	*25*	*40*	*100*
P value	*> 0.05 (N.S.)*					

*** Varicocele grades :**

In the present study, various grades of varicoceles were encountered and classified into 4 grades :

Grade 0 (subclinical) was found in 5 out of 40 patients (12.5%) in group I and group II, while grade I was found in 15 patients (37.5%) in group I and in 16 patients (40%) in group II. Grade II was found in 15 patients (37.5%) in group I and in 14 patients (35%) in group II. Finally, grade III was found in 5 patients (12.5%) in group I and group II. Statistically, no significant difference was detected between both groups ($P > 0.05$) (Table 4).

Table (4): Shows the varicocele grades of both groups.

Varicocele grades	*Group I*		*Group II*		*P value*
	No.	*%*	*No.*	*%*	
Grade 0	*5*	*12.5*	*5*	*12.5*	*> 0.05 (N.S.).*
Grade I	*15*	*37.5*	*16*	*40*	*> 0.05 (N.S.).*
Grade II	*15*	*37.5*	*14*	*35*	*> 0.05 (N.S.).*
Grade III	*5*	*12.5*	*5*	*12.5*	*> 0.05 (N.S.).*
Total	*40*	*100*	*40*	*100*	*> 0.05 (N.S.).*

*** Relationship between testicular volume and sperm count :**

- In group I (table 5) :

The mean Rt. testicular volume was 16.63 ± 2.35 c.c. for patients with sperm count > 10X 10^6/ml. (30 patients) and for those with sperm count <10X 10^6/ml. (10 patients), was 12.90 ± 3.51 c.c. This difference was statistically highly significant (P < 0.001).

The mean Lt. testicular volume was 15.20 ± 2.39 c.c. for patients with sperm count >10 X 10^6/ml. (30 patients) and for those with sperm count < 10 X 10^6/ml. (10 patients), was 11 ± 4.71 c.c. This difference was statistically highly significant (P < 0.001).

Table (5): Shows the comparison between the preoperative testicular volume for patients with sperm count > 10 X 10^6/ml. and patients with sperm count < 10 X 10^6 / ml. in Group I.

Group I	Rt. testicular volume c.c.			Lt. testicular volume c.c.		
	No.	Mean	S.D.	No.	Mean	S.D.
Count > 10 X10^6/ml.	30	16.63	2.35	30	15.20	2.39
Count < 10 X 10^6/ml.	10	12.90	3.51	10	11	4.71
P value	< 0.001**			< 0.001**		

** = Highly significant.

- In group II (Table 6)

The mean Rt. testicular volume was 16.86 ± 2.14 c.c. for patients with sperm count > 10 X 10^6/ml. (30 patients) and for those with sperm count < 10 X 10^6/ml. (10 patients), was 13.80 ± 4.61 c.c. This difference was statistically significant (P < 0.01).

The mean Lt. testicular volume was 14.83 ± 2.19 c.c. for patients with sperm count > 10 X 10^6/ml. (30 patients) and for those with sperm count < 10 X 10^6/ml. (10 patients), was 10.40 ± 4.32 c.c. This difference was statistically significant (P < 0.01).

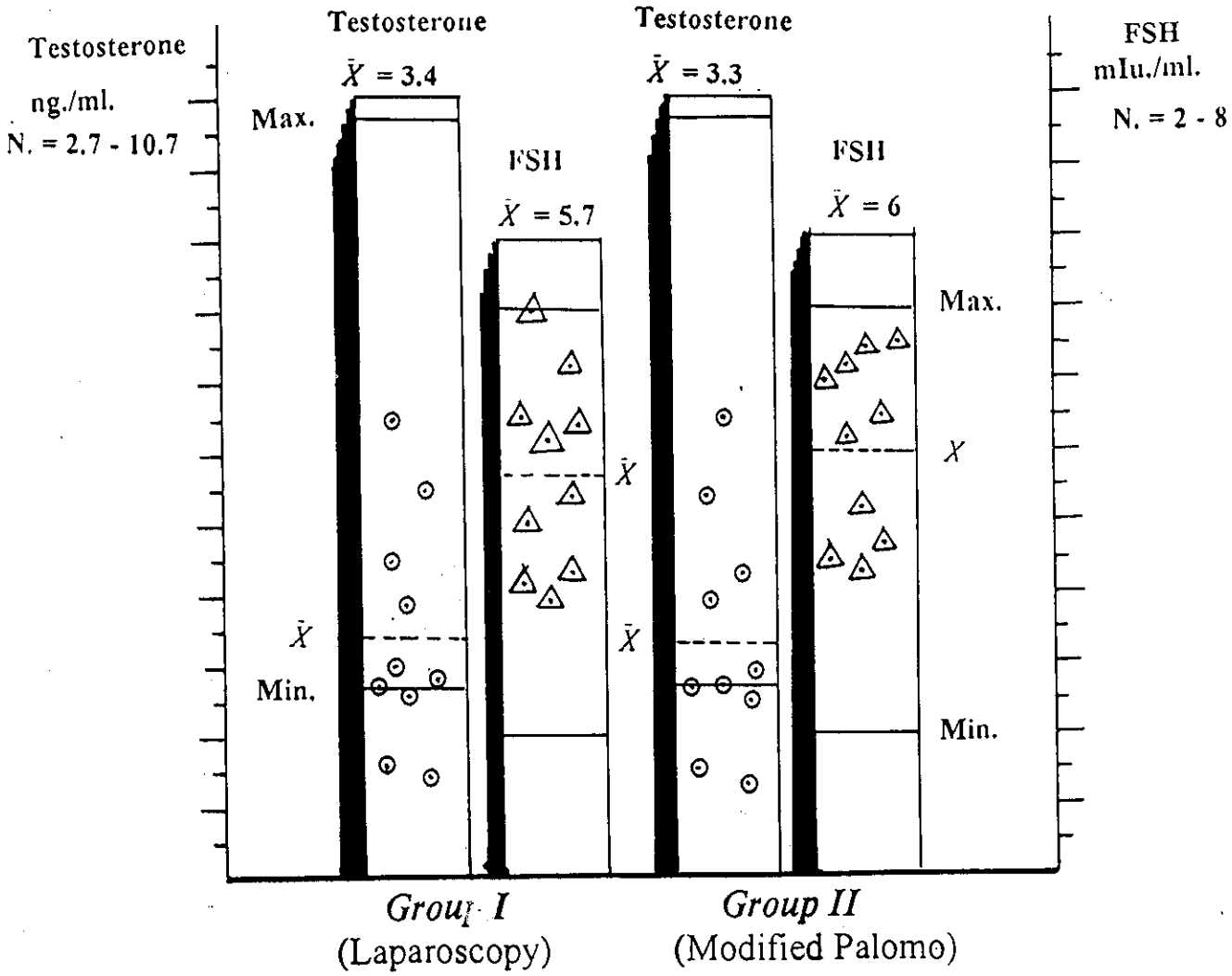
Table (6): Shows the comparison between the preoperative testicular volume for patients with sperm count 10 X 10^6/ml. and patients with sperm count 10 X 10^6/ml. in Group II.

Group II	Rt. testicular volume c.c.			Lt. testicular volume c.c.		
	No.	Mean	S.D.	No.	Mean	S.D.
Count > 10 X10^6/ml.	30	16.86	2.14	30	14.83	2.19
Count < 10 X 10^6/ml.	10	13.80	4.61	10	10.40	4.32
P value	< 0.01*			< 0.01*		

* *Significant.*

*** Serum testosterone and F.S.H. in cases with sperm count < 10 X 10^6/ml. of both groups :**

As shown in Fig. (13), the mean serum testosterone was 3.45 ± 1.64 ng/ml. for group I and for group II, was 3.37 ± 1.65 ng/ml., while the mean serum F.S.H. was 5.71 ± 1.37 mIu./ml. for group I and for group II, was 6.05±1.26 mIu./ml. This difference was statistically insignificant (P>0.05).



(Ten patients in each group with sperm count < 10 X 10^6/ml.)

N. = Normal value.

$\bar{X}$ = Mean value.

Min. = Minimum value.

Max. = Maximum value.

Fig. (13): Shows the comparison between the preoperative serum testosterone and F.S.H. of both groups for cases with sperm count < 10 X 10^6/ml.

*** Operative time :**

The operative time ranged from 15 to 50 minutes (Mean : 25 ± 8.63 min.) in group I and from 20 to 60 minutes (Mean : 32 ± 10.84 min.) in group II. The difference between both groups was statistically significant ($P < 0.01$) (Table 7).

Table (7): Shows the mean operative time of both groups.

	No.	Operative time "Minutes"		
		Range	Mean	S.D.
Group I	40	15-50	25	8.63
Group II	40	20-60	32	10.84
P value	< 0.01*			

*** Post operative analgesia :**

The post operative use of pain medications in group I was required for only 12 out of 40 patients (30%) in the form of simple non narcotic analgesic after being discharged from the recovery room. On the other hand, all patients (100%) in group II had been required both simple and narcotic analgesic after being discharged from the recovery room (Table 8).

Table (8): Shows the postoperative analgesia needed for both groups.

	Needed		Not needed		Total	
	No.	%	No.	%	No.	%
Group I	12	30	28	70	40	100
Group II	40	100	--	--	40	100
P value	< 0.001**					

Analysis of the results in table (8) showed that there was a statistically highly significant difference between both groups for pain medication ($P < 0.001$).

*** Postoperative hospital stay :**

The postoperative hospital stay ranged from 6 to 24 hours (Mean : 14.5 ± 17.38 hrs.) in group I and from 24 to 120 hours (Mean : 36 ± 18.82 hrs.) in group II (Table 9).

Table (9): Shows the mean hospital stay of both groups.

	No.	Hospital stay "Hours"		
		Range	Mean	S.D.
Group I	40	6-24	14.5	17.38
Group II	40	24-120	36	18.82
P value	< 0.001 **			

Analysis of the results in table (9) showed that, patients who underwent laparoscopic varicocelectomy had a highly significant shorter postoperative hospital stay than those who underwent open varicocelectomy ($P < 0.001$).

*** Return to normal activity :**

The time of return to normal activity ranged from 3 to 9 days (Mean : 5 ± 1.82 days) in group I and from 7 to 21 days (Mean : 10 ± 2.87 days) in group II (Table 10).

Table (10): Shows the mean return to normal activity of both groups.

	No.	Return to normal activity "Days"		
		Range	Mean	S.D.
Group I	40	3-9	5	1.82
Group II	40	7-21	10	2.87
P value	< 0.001**			

Analysis of the results in table (10) showed that, there was a statistically highly significant difference between both groups ($P < 0.001$).

*** Complications :**

Overall complications were encountered in 2 out of 40 patients (5%) in group I, in the form of inferior epigastric vessels injury in one patient (2.5%) and pneumoscrotum in the other one (2.5%). There was no hydrocele formation or recurrence of the varicocele during the follow up period.

In group II, the overall complications were encountered in 6 out of 40 patients (15%), in the form of testicular atrophy

In one patient (2.5%), intraoperative bleeding (due to slipped ligature of the proximal end of the cut off testicular veins) in one patient (2.5%), hydrocele formation in 2 patients (5%) and varicocele recurrence in 2 patients (5%) during the follow up period (Table 11).

Table (11): Shows the complications of varicocelectomy in both groups.

Complications	*Group I*		*Group II*	
	No.	%	No.	%
Testicular atrophy	1	2.5	1	2.5
Bleeding	-	-	1	2.5
Pneumoscrotum.	1	2.5	-	-
Hydrocele.	-	-	2	5
Recurrence	-	-	2	5
Total	2	5	6	15
P value	*< 0.05**			

Analysis of the results in table (11) showed a significant decrease in the incidence of complications in the laparoscopic group than the open group ($P < 0.05$).

Impact of varicocele size on the results after varicocelectomy

* **Correlation between varicocele grade and preoperative seminal parameters for patients with sperm count > 10 X 10^6/ml. of both groups (60 patients).**

Exclusion of the ten cases in each group in whom the sperm count was <10 X 10^6/ml. was done in order not to affect the homogenicity of the calculated numbers as either results showed extreme statistical improvement which would affect the overall statistical results homogenicity.

The mean preoperative sperm count for grade 0 was 25 ± 3.36 million/ml. and was 17.33 ± 5.50 million/ml for grade III. The mean preoperative motility percentage (1st hour) for grade 0 was 32.14 ± 9.94% and was 25.83 ±16.25% for grade III. The mean preoperative abnormal forms percentage for grade 0 was 30.71 ± 6.72% and was 40 ± 8.94% for grade III (Table 12).

Table (12):Shows the mean of the preoperative seminal parameters among the studied cases of both groups with sperm count >10X10^6 / ml. according to the grade of varicocele.

Varicocele grades	*No.*	*Count X 10^6/ml*		*Motility % (1st hour)*		*Abnormal forms %*	
		Mean	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*
Grade 0	7	25	3.36	32.14	9.94	30.71	6.72
Grade I	25	20.68	3.71	28.40	8.98	35.60	7.40
Grade II	22	20.31	4.15	27.72	8.82	35.68	9.54
Grade III	6	17.33	5.50	25.83	16.25	40	8.94
Total	60	20.71	4.34	28.33	9.77	35.50	8.42
P value		> 0.05 (N.S.)		> 0.05 (N.S.)		> 0.05 (N.S.)	

Analysis of the results in table (12) showed that : No significant difference was detected, i.e. the grade of varicocele had no relationship to the preoperative seminal parameters (P > 0.05).

* **Correlation between varicocele grade and the mean of seminal parameters improvement percent for patients with sperm count > 10 X 10^6/ml. of both groups (60 patients).**

- After 3 months :

The mean improvement percent of sperm count was 44.96 ± 19.47% for grade 0, 23.49 ± 22.01% for grade I, 18.46 ± 25.33% for grade II and 25.71 ± 37.98% for grade III. The mean improvement percent of motility was 69.52 ± 43.90% for grade 0, 65.73 ± 53.53% for grade I, 62.57 ± 45.25% for grade II and 75.55 ± 67.54% for grade III. The mean improvement percent of abnormal forms was 30.20 ± 17.10% for grade 0, 17.38 ± 13.74% for grade I, 16.10 ± 16.01% for grade II and 18.47 ± 4.23% for grade III (Table 13).

Table (13): Shows the mean of seminal parameters improvement percent 3-months postoperative among the studied cases according to the grade of varicocele (60 patients).

Varicocele grades	*No.*	*Count X 10^6/ml*		*Motility % (1st hour)*		*Abnormal forms %*	
		Mean	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*
Grade 0	7	44.96	19.47	69.52	43.90	30.20	17.10
Grade I	25	23.49	22.01	65.73	53.53	17.38	13.74
Grade II	22	18.46	25.33	62.57	45.25	16.10	16.01
Grade III	6	25.71	37.98	75.55	67.54	18.47	4.23
Total	60	24.37	25.50	66	49.92	18.52	14.77
P value		> 0.05 (N.S.)		> 0.05 (N.S.)		> 0.05 (N.S.)	

Analysis of the results in table (13) showed that there was no statistically significant relationship between the varicocele grade and seminal parameters improvement percent after 3 months (P > 0.05).

- After 6 months :

The mean improvement percent of sperm count was 125.28 ± 55.46% for grade 0, 85.75 ± 47.82% for grade I, 79.02 ± 43.61% for grade II and 67.30 ± 40.99% for grade III. The mean improvement percent of motility was 119.76 ± 71.50% for grade 0, 116.10 ± 68.42% for grade I, 117.15 ± 57.41% for grade II and 162.22 ± 175.01% for grade III. The mean improvement percent of abnormal forms was 50.45 ± 34.46% for grade 0, 35.52 ± 22.71% for grade I, 33.67 ± 21.51% for grade II and 32.50 ± 17.96% for grade III (Table 14).

Table (14): Shows the mean of semen parameters improvement percent 6-months postoperative among the studied cases according to the grade of varicocele (60 patients).

Varicocele grades	*No.*	*Count X 10^6/ml*		*Motility % (1st hour)*		*Abnormal forms %*	
		Mean	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*
Grade 0	7	125.28	55.46	119.76	71.50	50.45	34.46
Grade I	25	85.75	47.82	116.10	68.42	35.52	22.71
Grade II	22	79.02	43.61	117.15	57.41	33.67	21.51
Grade III	6	67.30	40.99	162.22	175.01	32.50	17.96
Total	60	86.05	47.95	121.52	79.88	36.28	23.46
P value		> 0.05 (N.S.)		> 0.05 (N.S.)		> 0.05 (N.S.)	

Analysis of the results in table (14) showed that there was no statistically significant relationship between the varicocele grade and seminal parameters improvement percent after 6 months (P > 0.05).

*** Correlation between varicocele grade and postoperative seminal parameters improvement percent for patients with *sperm count > 10 X 10^6/ml. in group I (30 patients)* :**

As shown in table (15), there was statistically insignificant relationship between the grade of varicocele and postoperative seminal parameters improvement percent after laparoscopic varicocelectomy (Table 18).

Table (15): *Shows the relation of the varicocele grade to the improvement percent in seminal parameters after laparoscopic varicocelectomy for patients with sperm count > 10 X 10^6/ml. (30 cases).*

Varicocele grades	*Grade 0*		*Grade I*		*Grade II*		*Grade III*		*Total*
No.	*3*		*12*		*12*		*3*		*30*
Seminal parameters	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*	*P value*
** Preoperative :*									
Count X 10^6/ml.	*24.33*	*3.21*	*19.66*	*4.18*	*21.16*	*3.27*	*19.33*	*6.11*	*> 0.05 (N.S.)*
Motility %	*28.33*	*10.40*	*25*	*7.97*	*28.75*	*8.01*	*30*	*20*	*> 0.05 (N.S.)*
Abnormal forms %	*35*	*5*	*37.91*	*8.38*	*35.41*	*9.15*	*36.66*	*5.77*	*> 0.05 (N.S.)*
** After 3 months :*									
Count X 10^6/ml.	*62.52*	*16.72*	*31.92*	*21.58*	*25.93*	*21.47*	*21.48*	*51.64*	*> 0.05 (N.S.)*
Motility %	*100*	*50*	*91.80*	*62.78*	*74.44*	*55.74*	*51.11*	*42.86*	*> 0.05 (N.S.)*
Abnormal forms %	*42.06*	*8.36*	*23.96*	*12.24*	*16.71*	*18.27*	*18.05*	*6.36*	*> 0.05 (N.S.)*
** After 6 months :*									
Count X 10^6/ml.	*171.69*	*52.80*	*107.92*	*46.84*	*98.72*	*40.87*	*62.90*	*59.16*	*> 0.05 (N.S.)*
Motility %	*168.33*	*88.08*	*160.27*	*67*	*125.55*	*65.52*	*96.66*	*89.62*	*> 0.05 (N.S.)*
Abnormal forms %	*71.23*	*24.65*	*45.84*	*23.04*	*42.80*	*22.38*	*30.55*	*27.74*	*> 0.05 (N.S.)*

*** Correlation between varicocele grade and postoperative seminal parameters improvement percent for patients with sperm count > 10 X 10^6/ml. in group II (30 patients).**

As shown in table (16), there was statistically insignificant relationship between the grade of varicocele and postoperative seminal parameters improvement percent after modified Palomo operation (Table 19).

Table (16): Shows the relation of the varicocele grade to the improvement percent in seminal parameters after modified Palomo operation for patients with sperm count > 10 X 10^6/ml. (30 cases).

Varicocele grades	Grade 0		Grade I		Grade II		Grade III		Total
No.	4		13		10		3		30
Seminal parameters	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	P value
* Preoperative : Count X 10^6/ml.	25.50	3.87	21.61	3.09	19.30	5.01	15.33	5.13	> 0.05 (N.S.)
Motility %	35	10	31.53	8.98	26.50	10.01	21.66	14.43	> 0.05 (N.S.)
Abnormal forms %	27.50	6.45	33.46	5.91	36	10.48	43.	11.54	> 0.05 (N.S.)
* After 3 months : Count X 10^6/ml.	31.79	5.67	15.72	20.15	9.50	27.75	29.94	29.78	> 0.05 (N.S.)
Motility %	46.66	23.72	41.66	28.46	48.33	23.83	100	88.19	> 0.05 (N.S.)
Abnormal forms %	21.30	17.10	11.30	12.52	15.38	13.75	18.88	1.92	> 0.05 (N.S.)
* After 6 months : Count X 10^6/ml.	90.48	22.92	65.29	40.22	55.39	35.48	71.71	25.36	> 0.05 (N.S.)
Motility %	83.33	30.42	75.32	38.65	107.08	47.30	227.77	235.89	> 0.05 (N.S.)
Abnormal forms %	34.88	34.87	26	18.45	22.72	14.92	34.44	5.09	> 0.05 (N.S.)

Impact of varicocele laterality on the results after varicocelectomy

* **Correlation between varicocele side and improvement percent in seminal parameters in group I for patients with sperm count > 10 X 10^6/ml. (30 cases) :**

- After 3 months :

The mean improvement percent in count was 80.07 ± 61.16% for unilateral cases and 85.83 ± 43.30% for bilateral cases. As regard to motility percentage, it was 23.95 ± 23.62% for unilateral cases and 52.43 ± 21.30% for bilateral cases, while in abnormal forms percentage, it was 19.02 ± 15.57% for unilateral cases and 41.25 ± 13.11% for bilateral cases (Table 17).

- After 6 months :

The mean improvement percent in count was 140.75 ± 73.95% for unilateral cases and 141.04 ± 64.16% for bilateral cases. As regard to motility percentage, it was 92.60 ± 47.82% for unilateral cases and 143.27 ± 40.01% for bilateral cases, while in abnormal forms percentage, it was 37.47 ± 20.76% for unilateral cases and 68.08 ± 18.14% for bilateral cases (Table 17).

Table (17): Shows the relation of varicocele side to the improvement percent in seminal parameters after laparoscopic varicocelectomy for patients with sperm count > $10X10^6$/ml. (30 cases).

Varicocele side (No.)	Left (22)		Bilateral (8)		P value
Seminal parameters	Mean	S.D.	Mean	S.D.	
* Preoperative : Sperm count X 10^6/ml.	19.27	3.54	21.62	2.20	> 0.05 (N.S.)
Motility %.	25.68	9.03	31.87	9.23	>0.05 (N.S.)
Abnormal forms %.	36.81	9.06	35.62	4.17	>0.05 (N.S.)
* After 3 months : Count X 10^6/ml.	80.07	61.16	85.83	43.30	>0.05 (N.S.)
Motility %.	23.95	23.62	52.43	21.30	<0.05*
Abnormal forms %.	19.02	15.57	41.25	13.11	<0.05 *
* After 6 months : Count X 10^6/ml.	140.75	73.95	141.04	64.16	>0.05 (N.S.)
Motility %.	92.60	47.82	143.27	40.01	<0.001**
Abnormal forms %.	37.47	20.76	68.08	18.14	<0.001**

Analysis of the results in table (17) showed that, there is insignificant difference in sperm count; after 3 and 6 months, whether the patients had unilateral or bilateral varicocelectomy ($P > 0.05$). However, there is a statistically significant increase in motility % and decrease in abnormal forms % in bilateral than unilateral cases, 3 months after laparoscopic varicocelectomy ($P < 0.05$).

There is a highly significant increase in motility % and decrease in abnormal forms % in bilateral than unilateral cases, 6 months after laparoscopic varicocelectomy ($P < 0.001$).

* **Correlation between varicocele side and improvement percent in seminal parameters in group II for patients with sperm count > 10 X 10^6/ml (30 cases) :**

- After 3 months :

The mean improvement percent in count was 52.89 ± 41.40% for unilateral cases and 42.14 ± 19.16% for bilateral cases. As regard to motility percentage, it was 13.75 ± 25.48% for unilateral cases and 28.58 ± 5.28% for bilateral cases, while in abnormal forms percentage, it was 13.18 ± 11.69% for unilateral cases and 29.91 ± 16.34% for bilateral cases (Table 18).

- After 6 months :

The mean improvement percent in count was 109.23 ± 96.20% for unilateral cases and 79.16 ± 18.47% for bilateral cases. As regard to motility percentage, it was 65.27 ± 34.77% for unilateral cases and 79.91 ± 14.87% for bilateral cases, while in abnormal forms percentage, it was 22 ± 13.76% for unilateral cases and 53.14 ± 25.27% for bilateral cases (Table 18).

Table (18): Shows the relation of varicocele side to the improvement percent in seminal parameters after Palomo operation for patients with sperm count > 10 X 10^6/ml. (30 cases).

Varicocele side (No.)	Left (23)		Bilateral (7)		P value
Seminal parameters	Mean	S.D.	Mean	S.D.	
* Preoperative : Count X 10^6/ml.	19.60	4.64	24.42	2.82	>0.05 (N.S.)
Motility %.	27.39	10.21	35.71	7.86	>0.05 (N.S.)
Abnormal forms %.	36.30	8.55	28.57	7.48	>0.05 (N.S.)
* After 3 months : Count X 10^6/ml.	52.89	41.40	42.14	19.16	>0.05 (N.S.)
Motility %.	13.75	25.48	28.58	5.28	< 0.05 *
Abnormal forms %.	13.18	11.69	29.91	16.34	< 0.05 *
* After 6 months : Count X 10^6/ml.	109.23	96.20	79.16	18.47	> 0.05 (N.S.)
Motility %.	65.27	34.77	79.91	14.87	< 0.001**
Abnormal forms %.	22	13.76	53.14	25.27	< 0.001**

Analysis of the results in table (18) showed that, there is insignificant difference in sperm count; after 3 and 6 months, whether the patients had unilateral or bilateral varicocelectomy ($P > 0.05$). However, there is a statistically significant increase in motility % and decrease in abnormal forms % in bilateral than unilateral cases, 3 months after modified Palomo operation ($P < 0.05$).

There is a highly significant increase in motility % and decrease in abnormal forms % in bilateral than unilateral cases, 6 months after modified Palomo operation ($P < 0.001$).

Treatment outcome after varicocelectomy

* *Effect of varicocelectomy on individual semen parameters :*

1) All cases subjected to laparoscopic varicocelectomy (group I) :

- Count X 10^6/ml. :

The preoperative sperm count ranged from 1 to 28 million/ml. with a mean of 16.5 ± 8.19 million/ml. which increased to 22.5 ± 11.86 million/ml. 3 months after the operation and to 35 ± 19.60 million/ml. 6 months after the operation (Table 19).

- Motility percentage (1st hour) :

The preoperative motility percentage ranged from 10 to 50% with a mean of 29 ± 9.48% which increased to 45 ± 11.98% after 3 months and to 57 ± 12.23% after 6 months (Table 19).

- Abnormal forms percentage :

The preoperative abnormal forms percentage ranged from 10 to 50% with a mean of 32.5±11.03% which decreased to 25.5 ± 8.14% after 3 months and to 18 ± 8.60% after 6 months (Table 19).

Table (19): Shows the mean of the semen parameters of all cases subjected to laparoscopic varicocelectomy (40 patients) and compared preoperatively, 3 and 6 months after the operation.

	No.	Count X 10^6/ml.		Motility %		Abnormal forms %	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Preoperative	40	16.5	8.19	29	9.48	32.5	11.03
After 3 ms.	40	22.5	11.86	45	11.98	25.5	8.14
P value		<0.05*		<0.001**		< 0.001 **	
Preoperative	40	16.5	8.19	29	9.48	32.5	11.03
After 6 ms.	40	35	19.60	57	12.23	18	8.60
P value		<0.001 **		<0.001**		< 0.001 **	

Analysis of the results in table (19) showed a significant improvement in count ($P<0.05$) and a highly significant improvement in motility % and abnormal forms % ($P < 0.001$) after 3 months. However, a highly significant improvement in all seminal parameters was noted after 6 months ($P < 0.001$).

2) All cases subjected to modified Palomo operation (group II) :

- Count X 10^6/ml. :

The preoperative sperm count ranged from 2 to 29 million/ml. with a mean of 16.6 ± 8.38 million/ml. which increased to 19.6 ± 10.28 million/ml. 3 months after the operation and to 28 ± 15.80 million/ml. 6 months after the operation (Table 20).

- Motility percentage (1st hour) :

The preoperative motility percentage ranged from 5 to 50% with a mean of 30 ± 9.93% which increased to 41.5 ± 11.33% after 3 months and to 51.5 ± 11.88% after 6 months (Table 20).

- Abnormal forms percentage :

The preoperative abnormal forms percentage ranged from 15 to 50% with a mean of 32 ± 9.46% which decreased to 26.5 ± 8.48% after 3 months and to 22 ± 8.45% after 6 months (Table 20).

Table (20): Shows the mean of the semen parameters of all cases subjected to modified Palomo operation (40 patients) and compared preoperatively, 3 and 6 months after the operation.

	No.	Count X 10^6/ml.		Motility %		Abnormal forms %	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Preoperative	40	16.6	8.38	30	9.93	32	9.46
After 3 ms.	40	19.6	10.28	41.5	11.33	26.5	8.48
P value		<0.05*		<0.001**		< 0.001**	
Preoperative	40	16.5	8.19	29	9.48	32.5	11.03
After 6 ms.	40	28	15.80	51.5	11.88	22	8.45
P value		<0.001**		<0.001**		< 0.001**	

Analysis of the results in table (20) showed a significant improvement in count ($P<0.05$) and a highly significant improvement in motility % and abnormal forms % ($P < 0.001$) after 3 months. However, a highly significant improvement in all seminal parameters was noted after 6 months ($P < 0.001$).

*** Comparison between the effect of laparoscopic varicocelectomy (Group I) and the effect of modified Palomo operation (Group II) on the sperm count after 3 and 6 months :**

The mean preoperative sperm count for group I was 16.5 ± 8.19 million/ml. and it was 16.6 ± 8.38 million/ml. for group II. 3 months later, the mean sperm count increased to 22.5 ± 11.86 million/ml. in group I and to 19.6 ± 10.28 million/ml. in group II. After 6 months, the mean sperm count increased to 35 ± 19.60 million/ml. in group I and to 28 ± 15.80 million/ml. in group II (Table 21).

Table (21): Shows the comparison between the sperm count X 10^6/ml of both groups (preoperative, 3 & 6 months after the operation).

Sperm count x 10^6/ml.	*Group I*			*Group II*			*P value*
	No	*Mean*	*S.D*	*No*	*Mean*	*S.D*	
Preoperative.	*40*	*16.5*	*8.19*		*16.6*	*8.38*	*>0.05 (N.S.)*
After 3 months.	*40*	*22.5*	*11.86*	*40*	*19.6*	*10.28*	*> 0.05 (N.S.)*
After 6 months.	*40*	*35*	*19.60*	*40*	*28*	*15.80*	*< 0.05**

Analysis of the results in table (21) showed insignificant difference between both groups in the preoperative sperm count (P > 0.05). The sperm count, 3 months after the operation was also statistically insignificant between both groups (P > 0.05). However, there was a statistically significant increase in the sperm count, 6 months after laparoscopic varicocelectomy than modified Palomo operation (P < 0.05).

*** Comparison between the effect of laparoscopic varicocelectomy (Group I) and the effect of modified Palomo operation (Group II) on the motility percentage (1st hour) 3 and 6 months after the operation :**

The mean preoperative motility percentage for group I was 29 ± 9.48% and it was) ± 9.93% for group II. 3 months later, the mean motility percentage increased to 45 ± 11.98% in group I and to 41.5 ± 11.33% in group II. After 6 months, the mean motility percentage increased to 57 ± 12.23% in group I and to 51.5 ± 11.88% in group II (Table 22).

Table (22): Shows the comparison between the sperm motility % of both groups (preoperative, 3 & 6 months after the operation).

Sperm motility % (1st hour)	*Group I*			*Group II*			*P value*
	No	*Mean*	*S.D*	*No*	*Mean*	*S.D*	
Preoperative.	*40*	*29*	*9.48*	*40*	*30*	*9.93*	*>0.05 (N.S.)*
After 3 months.	*40*	*45*	*11.98*	*40*	*41.5*	*11.33*	*> 0.05 (N.S.)*
After 6 months.	*40*	*57*	*12.23*	*40*	*51.5*	*11.88*	*< 0.05**

Analysis of the results in table (22) showed insignificant difference between both groups in the preoperative motility percentage (P > 0.05). The motility percentage 3 months after the operation was also statistically insignificant between both groups (P > 0.05). However, there was a statistically significant increase in the motility percentage 6 months after laparoscopic varicocelectomy than modified Palomo operation (P < 0.05).

* ***Comparison between the effect of laparoscopic varicocelectomy (Group I) and the effect of modified Palomo operation (Group II) on the abnormal forms percentage after 3 and 6 months :***

The mean preoperative abnormal forms percentage for group I was 32.5 ± 11.03% and it was 32 ± 9.46% for group II. 3 months later, the mean abnormal forms percentage decreased to 25.5 ± 8.14% in group I and to 26.5 ± 8.48% in group II. After 6 months, the mean abnormal forms percentage decreased to 18 ± 8.60% in group I and to 22 ± 8.45% in group II (Table 23).

Table (23): Shows the comparison between the sperm abnormal forms % of both groups (preoperative, 3 & 6 months after the operation).

Sperm abnormal forms %	Group I			Group II			P value
	No	Mean	S.D	No	Mean	S.D	
Preoperative.	40	32.5	11.03	40	32	9.46	>0.05 (N.S.)
After 3 months.	40	25.5	8.14	40	26.5	8.48	> 0.05 (N.S.)
After 6 months.	40	18	8.60	40	22	8.45	< 0.05*

Analysis of the results in table (23) showed insignificant difference between both groups in the preoperative abnormal forms percentage (P > 0.05). The abnormal forms percentage 3 months after the operation was also statistically insignificant between both groups (P> 0.05). However, there was a statistically significant decrease in the abnormal forms percentage 6 months after laparoscopic varicocelectomy than modified Palomo operation (P < 0.05).