RESULTS

This study was carried out on 45 cases randomly assigned into three groups according to the distance between the tip of the catheter and the endometrial uterine fundus at the moment of embryo deposition in the endometrial cavity: (10 ± 1.5 mm, 15 ± 1.5 mm and 20 ± 1.5 mm) respectively. The results were summarized in Tables (1-9).

There was equal distribution between all the three study groups regarding the main demographic, Infertility variables, IVF parameters and endocrine profile characteristics of the patients. Tables (1-4).

Table 1, shows the demographic characteristics of the studied cases. The age distribution of the studied cases ranged from 29 – 42 years. The main age was 34.2 years. No significant differences was reported regarding age (p=0.64) and BMI (p=0.44).

Table 2, shows the infertility variables of the studied cases regarding cause, type and duration of infertility. No significant differences among the groups regarding cause of infertility (p=0.94), type of infertility (p=0.41), and duration of infertility (p=0.15).

Table 3, shows the IVF-ET parameters of the studied cases regarding number of injected oocytes, fertilized oocytes, embryo grade A or B, number of transferred embryos, first-time transfers and difficult transfers.

It shows No significant differences among the groups regarding number of injected oocytes (p=0.64), fertilized oocytes (p=0.9), embryo grade A (p=0.81), embryo grade B (p=0.52), number of transferred embryos (p=0.84), first-time transfers (p=0.77), and Difficult transfers (p=0.86).

But It shows significant difference regarding transfer distance from the fundus (p=0.0001).

Table 4, shows no significant differences among the studied groups regarding endocrine profile components and the endometrial thickness on the day of embryo transfer

Table 5, shows significant difference in the clinical pregnancy rate when group III is compared with group I (p=0.046), but the statistically significant difference wasn't noted when group II is compared with group I or III (p=0.099 and 0.71) respectively.

It also shows higher implantation rate when group III or group II is compared with group I but with no statistically significant difference (p=0.1 and 0.15) respectively, and no statistically significant difference in implantation rate when group III is compared with group II (p=0.85).

Table 6, shows that cases with positive clinical pregnancy tend to be younger and less obese than negative cases; despite no statistically significant differences were reported.

Table 7, shows that There is no significant correlation between infertility variables (cause, type and duration of infertility) and positive clinical pregnancy, but conceived cases had shorter duration of infertility and 1ry infertility is commonest among them.

Table 8, shows that the successful transfers had higher frequency of good quality embryos, with no significant correlation. Significant correlation was found between first attempt IVF-ET and positive clinical pregnancy, successful cases had significantly higher frequency of first attempt IVF-ET in group II and III (p=0.005 and 0.019) respectively. Also Significant correlation was found between difficult transfers and positive clinical pregnancy, there were higher frequency of difficult transfers in the failed transfers with significant difference in all-patients (p=0.027).

Table 9, shows that there is a significant correlation between the hormonal parameters and clinical pregnancy rates. Day 3 LH levels were significantly higher in patients who achieved pregnancy than in patients who did not in group III (P=0.01) and serum E2 concentrations on the day of hCG administration (HCG day E2) levels were significantly higher in patients who achieved pregnancy than in patients who did not in group I (P=0.049).

Also significant difference in endometrial thickness was found in the successful and failed transfers in group I, endometrial thickness was significantly greater in patients who achieved pregnancy than in patients who did not (p= 0.0001).

Results

Results of the current study are demonstrated in the following tables and diagrams:

Table-1 Demographic characteristics of the studied cases (n=45)

Age (years)		**G I** (n=15)	**G II** (n=15)	**G III** (n=15)	**Total** (n=45)	**ANOVA**	
						F	p
Age (years)	Range	29.0 - 42.0	31.0 – 37.0	29.0 - 40.0	29.0 - 42.0	0.45	0.64
	Mean ± SD	33.8 ± 3.21	34.1 ± 1.9	34.7 ± 2.9	34.2 ± 2.7		
BMI (kg/m^2)	Range	23.4 - 32.4	24.0 - 33.6	23.4 – 31.2	23.4 – 33.6	0.85	0.44
	Mean ± SD	28.06 ± 3.24	29.2 ± 2.95	27.82 ± 3.16	28.36 ± 3.11		

This table shows the demographic characteristics of the studied cases. No significant differences were reported regarding age and BMI.

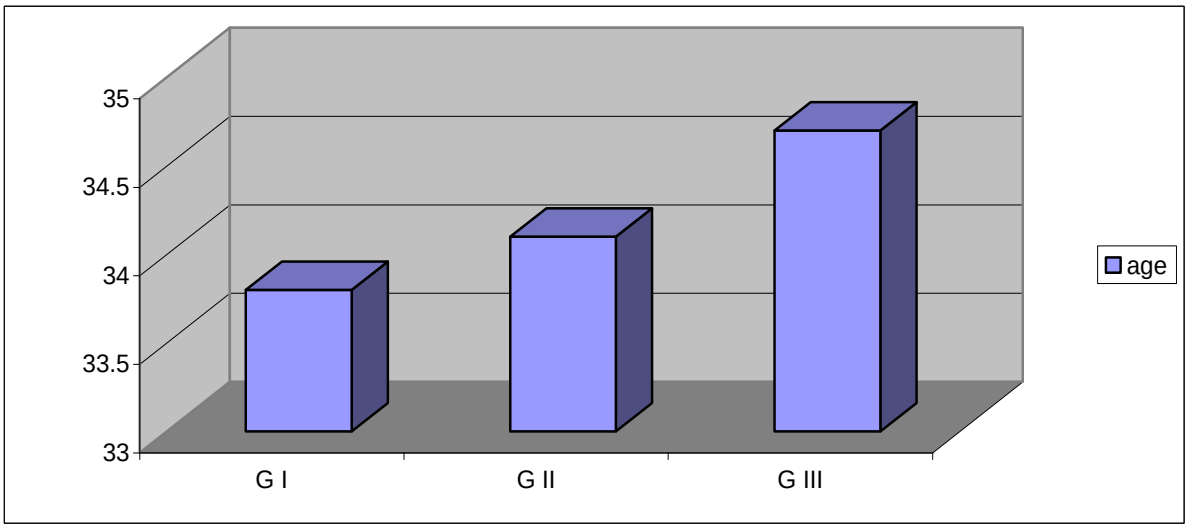

Fig. (I) Mean age of the studied groups

Table-2 Infertility variables in the studied groups

		G I (n=15)	**G II** (n=15)	**G III** (n=15)	**Total** (n=45)	**Chi-square test**	
						X^2	p
Etiology	Tubal	4 (26.7 %)	3 (20.0 %)	3 (20.0 %)	10 (22.2 %)	4.07	0.94
	Ovarian	1 (6.7 %)	2 (13.3 %)	-	3 (6.7 %)		
	Male factor	3 (20.0 %)	3 (20.0 %)	3 (20.0 %)	9 (20.0 %)		
	Endometrios.	3 (20.0 %)	2 (13.3 %)	4 (26.7 %)	9 (20.0 %)		
	Combined	3 20.0 %)	4 (26.7 %)	2 (13.3 %)	9 (20.0 %)		
	Unexplained	1 (6.7 %)	1 (6.7 %)	3 (20.0 %)	5 (11.1 %)		
Primary infertility		12 (80.0 %)	10 (66.7 %)	13 (86.7 %)	35 (66.7 %)	1.8	0.41
Duration*	Range	3-11	3-12	4-13	3-13	2.02	0.15
	Mean ± SD	6.2 ± 2.6	7.6 ± 3.2	8.2 ± 2.5	7.4 ± 2.9		

This table shows no significant differences among groups regarding cause of infertility (p=0.94), type of infertility (p=0.41), and duration of infertility (p=0.15).

***** One way ANOVA.

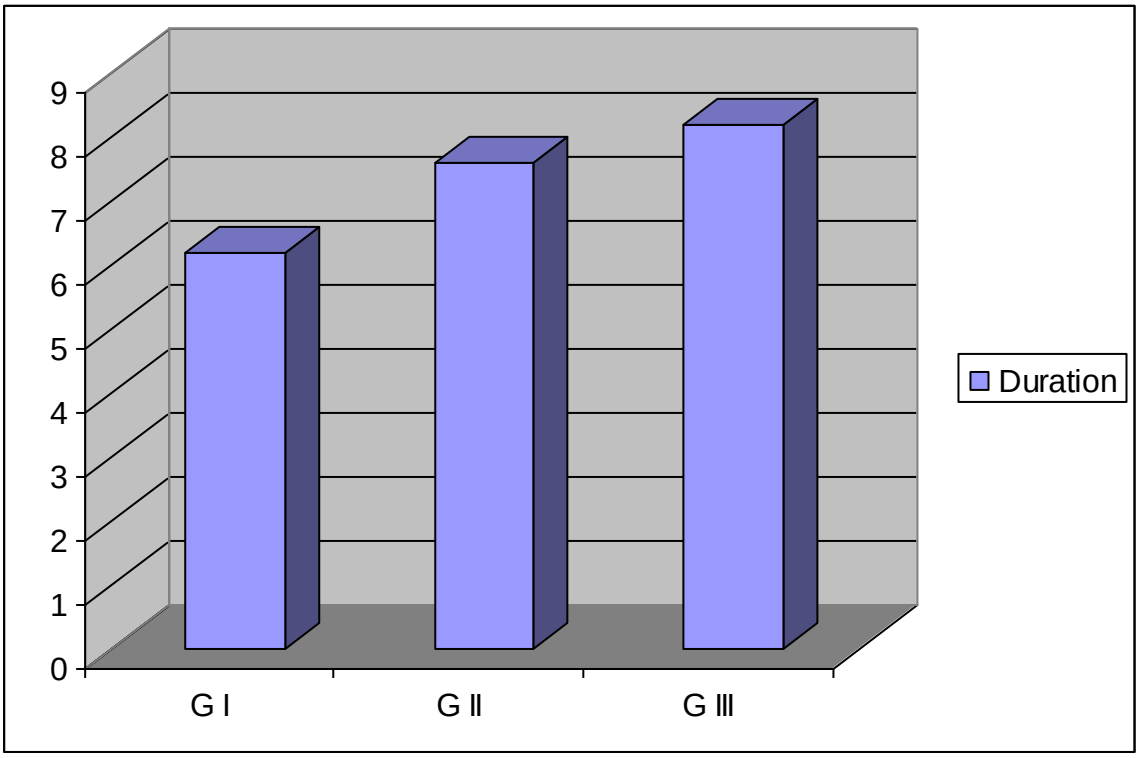

Fig. (II) Duration of infertility in the studied groups

Table-3 IVF parameters in the studied groups

			G I (n=15)	G II (n=15)	G III (n=15)	Total (n=45)	ANOVA	
							X^2	p
Injected oocytes		Range	5-12	5-12	5-11	5-12	0.45	0.64
		Mean ± SD	8.6 ± 2.5	7.9 ± 2.2	8.5 ± 2.0	8.3 ± 2.2		
Fertilized oocytes		Range	4-11	4-11	4-9	4-11	0.11	0.9
		Mean ± SD	6.7 ± 2.2	6.5 ± 2.1	6.8 ± 1.6	6.6 ± 1.9		
Transferred embryos		Range	2-5	2-5	2-5	2-5	0.17	0.84
		Mean ± SD	3.4 ± 1.1	3.6 ± 1.0	3.6 ± 1.1	3.5 ± 1.1		
Embryo grade	**A**	Range	1-4	1-4	1-4	1-4	0.21	0.81
		Mean ± SD	2.06 ± 0.88	1.86 ± 0.91	2.06 ± 1.09	2.0 ± 0.95		
	B	Range	1-2	1-3	0-3	0-3	0.67	0.52
		Mean ± SD	1.46 ± 0.51	1.73 ± 0.59	1.66 ± 0.81	1.62 ± 0.64		
TDF		Range	8.5-11.5	13.5-16.5	18.5-21.5	8.5-21.5	375.0	*** 0.0001
		Mean ± SD	10.0 ± 1.0	15.0 ± 1.0	20.0 ± 1.0	15.0 ± 4.2		
First treatment			7 (46.7 %)	6 (40.0 %)	8 (53.3 %)	21 (46.7 %)	0.54	0.77
Difficult transfers			3 (20.0 %)	2 (13.3 %)	3 (20.0 %)	8 (17.8 %)	0.34	0.86

This table shows no significant differences among groups regarding IVF-ET parameters except difference among groups regarding TDF, which is highly significant.

TDF: Transfer distance from the fundus

*** Significant difference at the 0.0001 level.

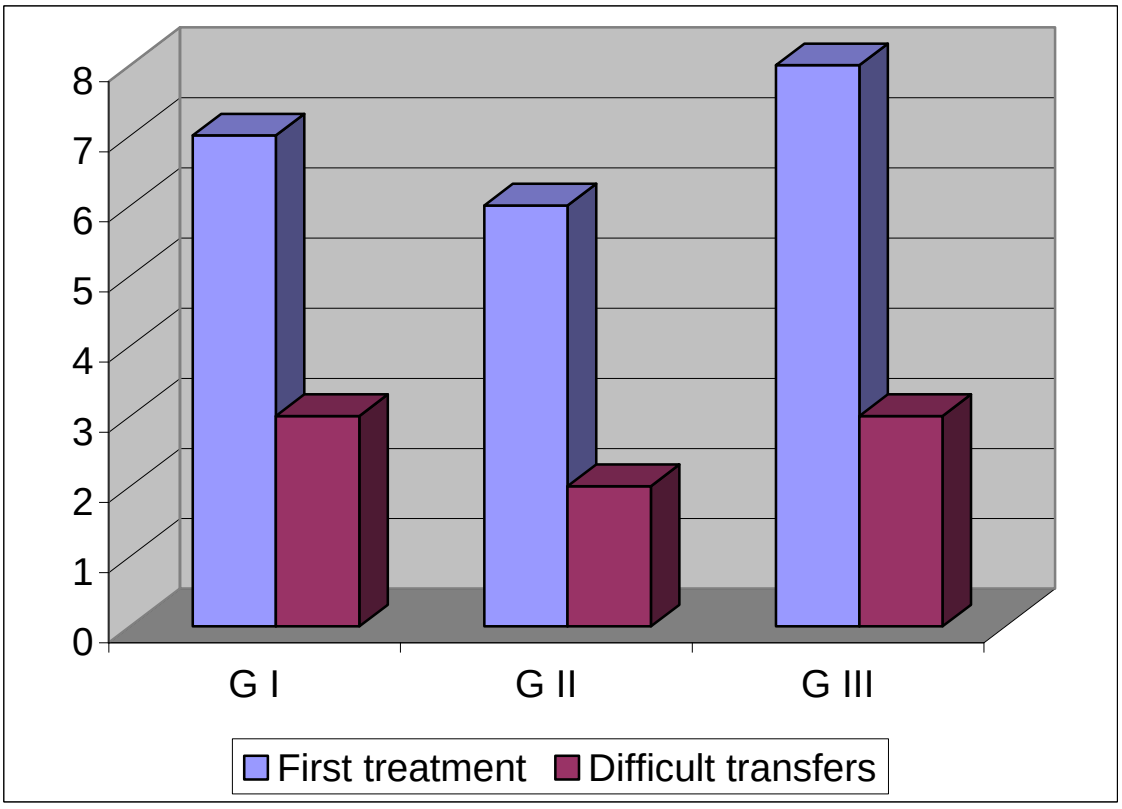

Fig. (III) Frequency of first time treatment and difficult transfers in the studied groups

Table-4 Endocrine profile and endometrial thickness in the studied groups (n=45)

		G I (n=15	**G II** (n=15)	**G III** (n=15)	**Total** (n=45)	**ANOVA**	
						F	P
Day 3 FSH (mIU/mL)	Mean ± SD	4.17 ± 1.4	4.08 ± 1.19	4.45 ± 1.42	4.23 ± 1.32	0.31	0.73
Day 3 LH (mIU/mL)	Mean ± SD	4.11 ± 2.0	4.6 ± 1.88	4.48 ± 1.91	4.4 ± 1.9	0.26	0.77
Day 3 E2 (pg/mL)	Mean ± SD	19.3 ± 7.53	21.63 ± 7.99	19.21 ± 9.35	20.04 ± 8.21	0.41	0.67
Day 9 E2 (pg/mL)	Mean ± SD	1954.33 ± 763.98	2004.33 ± 749.19	2142.66 ± 725.72	2033.77 ± 733.73	0.25	0.88
HCG day E_2 (pg/mL)	Mean ± SD	2153.33 ± 687.24	2221.33 ± 587.7	2526.0 ± 725.56	2300.22 ± 674.19	1.32	0.28
Endometrial thickness	Mean ± SD	12.62 ± 2.06	11.8 ± 1.88	13.0 ± 2.01	12.47 ± 2.01	1.42	0.25

This table shows no significant differences among the studied groups regarding endocrine profile components and endometrial thickness.

Table-5 ET outcome in the studied groups (n=45)

	G I (n=15)	**G II** (n=15)	**G III** (n=15)	**Total** (n=45)	**Chi-square test**	
					X^2	p
Implantation rate %	10.2	16.7	17.8	14.9	2.98	0.23
Clinical pregnancy rate	2 [a] (13.3 %)	6 (40.0 %)	7 [a] (46.7 %)	15 (33.3 %)	2.52	0.28

Clinical pregnancy rate:

GI vs GIII: p=0.046 [a], GI vs GII: 0.099, GII vs GIII: p=0.71.

[a] Values were significantly different (P < 0.05).

Implantation rate:

GI vs GIII: p=0.1, GI vs GII: 0.15, GII vs GIII: p=0.85.

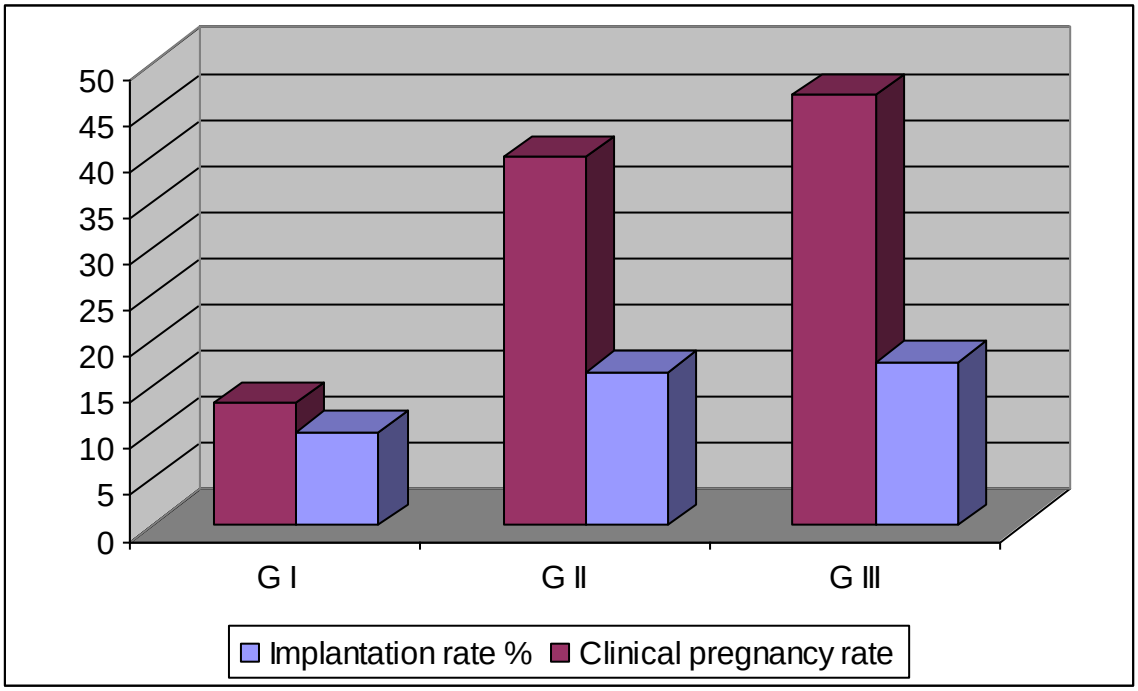

Fig. (IV) Implantation rate and clinical pregnancy rate in the studied groups

Table-6 Comparison of demographic characteristics between successive and failed ET in the studied groups

	Clinical pregnancy	**G I** (n=2/13)	**G II** (n=6/9)	**G III** (n=7/8)	**Total** (n=15/30)
Age (years)	+	33.0 ± 1.41	33.4 ± 1.4	33.6 ± 3.1	33.7 ± 2.8
	-	33.92 ± 3.42	35.2 ± 2.3	36.6 ± 2.2	35.3 ± 2.3
	Student t test	P=0.72	P=0.096	P=0.12	P=0.066
BMI (kg/m^2)	+	27.6 ± 3.2	28.7 ± 3.1	27.04 ± 2.9	28.2 ± 3.0
	-	30.95 ± 2.1	29.6 ± 3.0	28.5 ± 3.4	28.4 ± 3.2
	Student t test	P=0.19	P=0.58	P=0.39	P=0.82

This table shows that cases with positive clinical pregnancy tend to be younger and less obese than negative cases; despite no statistically significant differences were reported.

Table-7 Comparison of infertility variables between successive and failed ET in the studied groups

		G I (n=15)		**G II** (n=15)		**G III** (n=15)		**Total** (n=45)	
Clinical pregnancy		+	-	+	-	+	-	+	-
Etiology	Tubal	1	3	1	2	1	2	3	7
	Ovarian	-	1	1	1	-	-	1	2
	Male factor	1	2	1	2	2	1	4	5
	Endometrios.	-	3	1	1	1	3	2	7
	Combined	-	3	1	3	2	-	3	6
	Unexplained	-	1	1	-	1	2	2	3
Chi-square test		*P=0.74*		*P=0.63*		*P=0.41*		*P=0.93*	
Primary infertility		1	11	4	6	6	7	11	24
Chi-square test		*P=0.12*		*P=1.0*		*P=0.92*		*P=0.61*	
Duration	Mean ± SD	5.5 ± 0.71	6.3± 2.8	7.3± 3.2	7.8± 3.4	8.3± 2.8	8.1± 2.5	7.5± 2.82	7.3± 3.0
Student t test		*P=0.7*		*P=0.76*		*P=0.91*		*P=0.77*	

This table shows that cause, type and duration of infertility didn't add significant influence to the effect of study groups on IVF-ET outcome.

Table-8 Comparison of IVF parameters between successive and failed ET in the studied groups

			G I (n=15)		**G II** (n=15)		**G III** (n=15)		**Total** (n=45)	
Clinical pregnancy			**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**
Injected oocytes		Mean ± SD	9.5 ± 0.7	8.4 ± 2.6	7.1 ± 2.8	8.3 ± 1.7	8.7 ± 2.0	8.2 ± 2.1	8.2 ± 2.3	8.3 ± 2.1
		Student t test	*P=0.6*		*P=0.34*		*P=0.67*		*P=0.82*	
Fertilized oocytes		Mean ± SD	6.5 ± 0.7	6.6 ± 2.3	6.1 ± 2.8	6.6 ± 1.5	7.1 ± 1.6	6.5 ± 1.5	6.6 ± 2.1	6.6 ± 1.9
		Student t test	*P=0.91*		*P=0.67*		*P=0.45*		*P=0.96*	
Transferred embryos		Mean ± SD	4.0	3.3 ± 1.1	3.5 ± 1.3	3.6 ± 0.7	4.0 ± 1.2	3.2 ± 0.9	3.8 ± 1.2	3.4 ± 0.96
		Student t test	*P=0.56*		*P=0.79*		*P=0.21*		*P=0.24*	
Embryo grade	**A**	Mean ± SD	2.5 ± 0.7	2.0 ± .91	1.8 ± 0.98	1.8 ± 0.92	2.2 ± 1.1	1.87 ± 1.12	2.1 ± 0.99	1.93 ± 0.94
		Student t test	*P=0.49*		*P=0.91*		*P=0.49*		*P=0.51*	
	B	Mean ± SD	1.5 ± 0.7	1.4 ± 0.5	1.6 ± 0.51	1.7 ± 0.66	1.85 ± 0.69	1.5 ± 0.92	1.73 ± 0.59	1.56 ± 0.67
		Student t test	*P=0.93*		*P=0.74*		*P=0.42*		*P=0.42*	
TDF		Mean ± SD	11.25± 0.35	9.8 ± 0.92	15.2 ± 0.9	15.0 ± 1.03	19.6 ± 0.99	20.4 ±0.88	17.1 ± 3.6	13.9 ± 4.2

	Student t test	*P=0.017**		*P=0.76*		*P=0.12*		*P=0.018**	
First treatment		2	5	5	1	6	2	13	8
Chi-square test		*P=0.1*		*0.005***		*0.019**		*0.0001****	
Difficult transfers		-	3	-	2	-	3	-	8
Chi-square test		*P=0.45*		*P=0.22*		*P=0.07*		*0.027**	

This table shows that in a fixed distance between the fundus and catheter tip, other factors may contribute to improved IVF outcome.

In this table first IVF and to lesser extent difficult transfers are examples.

Table-9 Comparison of endocrine profile and endometrial thickness between successive and failed ET in the studied groups

		G I (n=15)		**G II** (n=15)		**G III** (n=15)		**Total** (n=45)	
Clinical pregnancy		**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**
Day 3 FSH (mIU/mL)	Mean ± SD	3.1 ± 0.14	4.3 ± 1.44	4.2 ± 1.3	3.9 ± 1.1	4.4 ± 1.6	4.4 ± 1.3	4.1 ± 1.4	4.2 ± 1.3
	Student t test	*P=0.26*		*P=0.64*		*P=0.95*		*0.86*	
Day 3 LH (mIU/mL)	Mean ± SD	4.9 ± 3.1	3.9 ± 1.9	5.3 ± 1.7	4.1 ± 1.8	5.7 ± 1.3	3.3 ± 1.7	5.4 ± 1.6	3.8 ± 1.8
	Student t test	*P=0.57*		*P=0.21*		*P=0.01**		*0.006***	
Day 3 E2 (pg/mL)	Mean ± SD	21.9 ± 7.7	18.8 ± 7.7	16.9 ± 7.7	24.7 ± 6.8	20.5 ± 10.8	18.02 ± 8.3	19.3 ± 8.9	20.4 ± 7.9
	Student t test	*P=0.61*		*P=0.059*		*P=0.61*		*0.67*	
Day 9 E2 (pg/mL)	Mean ± SD	2825.0 ± 219.2	1820.38 ± 728.8	2421.6 ± 649.9	1726.1 ± 707.5	2508.7 ± 637.5	1724.2 ± 609.8	2150.0 ± 707.8	1975.6 ± 751.3
	Student t test	*P=0.082*		*P=0.077*		*P=0.031**		*0.46*	
HCG day E2 (pg/mL)	Mean ± SD	3025.0 ± 176.7	2019.2 ± 634.2	2515.0 ± 253.6	2025.5 ± 675.5	2608.5 ± 70	2453.7 ± 787.3	2626.6 ± 513.3	2137.0 ± 692.6
	Student t test	*0.049**		*P=0.074*		*P=0.69*		*0.011**	
Endometrial thickness	Mean ± SD	13.01 ± 1.92	10.05 ± 0.21	11.8 ± 1.9	11.7 ± 1.9	13.05 ± 1.8	12.9 ± 2.3	12.6 ± 2.05	12.1 ± 1.9
	Student t test	*0.0001****		*0.93*		*P=0.92*		*0.48*	

This table shows some significant endocrine differences that may be responsible for the varied outcome for the same TDF.

Significant difference in endometrial thickness in the successful and failed transfers.