

Factors influencing reproductive performance following previous ectopic pregnancy

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ABSTRACT

Objective: To assess the factors that influence the reproductive performance in patients who had previous salpingectomy by laparotomy for ectopic pregnancy in the South-west Region of Saudi Arabia.

Methods: Fifty four patients who had pregnancies following salpingectomy for previous ectopic pregnancy were studied retrospectively at Abha Maternity Hospital in the Southern Region of Saudi Arabia.

Results: There were 130 ectopic pregnancies during the study period out of which 54 patients became pregnant subsequently. Of the subsequent pregnancies, there were 41 (80%) intrauterine pregnancies and 13 (20%) extrauterine recorded pregnancies. Out of the intrauterine pregnancies, 36 (88%) resulted in full term live births while abortion occurred in 5 (12%) of the cases. The risk of a 2nd ectopic pregnancy seemed to be positively related to the age of the patient and also the interval between the previous ectopic and new pregnancy, while it was negatively related to the parity of the patient. The mean age of the patients was 27.89 years and the mean parity 2.74. Of the 13 patients who had extrauterine pregnancies, 4 (30%) were nulliparous while 9 (70%) had had between 1-5 children. In those patients who had a repeat ectopic

pregnancy, the mean gestation of the ectopic pregnancy was 6.78 weeks while the interval between admission to hospital and surgery ranged between 1 to 48 hours with a mean of 21.85 hours. At the time of surgery, the fallopian tube was ruptured in 6 (46%) of the cases and these included patients who were nulliparous. They all had repeat salpingectomy. Conservative surgery was performed only in 2 (28%) of those whose fallopian tubes were not ruptured at the time of surgery.

Conclusion: It seemed as if the probability of repeat ectopic pregnancy increased as the age of the patient increased and the interval between the previous ectopic gestation and new pregnancy is prolonged. At the same time the probability of another ectopic pregnancy decreased as the parity increased. The obstetric outlook following laparotomy for ectopic pregnancy seemed not to be very encouraging as the fertility rate was about 48% and therefore, efforts should be geared at managing patients with ectopic pregnancy laparoscopically. A larger multicenter study is needed to validate these findings.

Keywords: Factors, influencing, reproductive performance, previous ectopic pregnancy.

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There has been a steady increase in the incidence of ectopic pregnancy all over the world in recent years, which may be explained by the increase in the incidence of pelvic infection.¹⁻⁴ Apart from being a major cause of maternal mortality; accounting for

4% of all maternal deaths in the United Kingdom (UK)⁵ and 9% of those in the United States of America (USA)⁶ between 1991 and 1993, it may also adversely affect future reproductive performance of some in such a way as to render them childless. They

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are childless either because they fail to subsequently conceive, or may have a repeat ectopic pregnancy. In those patients who fail to conceive, a tubal factor may be responsible in about 66% of the cases.⁷ The reality of the childlessness is borne by the fact that the ultimate method of infertility treatment; In vitro Fertilization (IVF) is still not readily available to the majority in this community. However, those who get pregnant subsequent to an ectopic pregnancy are at risk of another ectopic pregnancy, the risk of which is between 7 to 13 fold.⁸⁻¹⁰ It has been shown by Yao and Tulandi¹¹ that the recurrent ectopic pregnancy rate was lower after laparoscopy, than after laparotomy. In most gynecology units in our environment, open laparotomy remains the method of treatment of ectopic pregnancy, and therefore these patients are probably more prone to have a repeat ectopic pregnancy. This study was conducted to assess other factors, that may influence the reproductive performance following previous salpingectomy by laparotomy for ectopic pregnancy.

Methods. The hospital records of patients who were treated for ectopic pregnancy by laparotomy between June 1992 and May 1999 at the Abha Maternity Hospital were reviewed. They were 130 patients who had histologically proven tubal pregnancy. The subjects of this study were 54 patients who had another pregnancy following the previous ectopic pregnancy. The demographic data of the 54 patients who became pregnant after a previous pregnancy were obtained as well as the details and outcome of the pregnancy by way of intrauterine or extrauterine pregnancy, gestation at

diagnosis of ectopic pregnancy, time interval between admission and surgical intervention, abortion, and live births. The statistical analysis was carried out by SPSS version 9.0. The student's t-test, correlation coefficient and logistic regression were used. In the logistic regression, variables were selected on the basis of their clinical importance. The variables entered in the full model were age, parity and the interval between previous ectopic and new pregnancy.

Results. The maternal and clinical data is shown in Table 1. Of the 130 patients with previous ectopic pregnancy, 54 became pregnant subsequently giving a pregnancy rate of 42%. Patients who had more than one intrauterine pregnancy were counted only once in the analysis. The mean age of the patients was 27.81 years while the mean parity was 2.74. The mean interval between the previous ectopic pregnancy and the index pregnancy was 12.89 months. The age distribution in relation to subsequent pregnancy is shown in Table 2 while the age distribution in relation to the interval between previous ectopic and new pregnancy is shown in Table 3. The parity distribution in relation to subsequent pregnancy is shown in Table 4. Table 5 shows the parity distribution in relation to the interval between previous ectopic pregnancy and new pregnancy. The logistic regression models for risk factors influencing the recurrence of ectopic pregnancy are shown in Table 6. From the logistic regression full model, it was found that the probability of occurrence of ectopic pregnancy is increased by 0.05 for each years increase in the woman's age and by 0.10 for each

Table 1 - Maternal and clinical data.

	Subsequent intrauterine pregnancy (n = 41)	Repeat ectopic pregnancy (n = 13)	Total Pregnancy (n = 54)
Variable	Mean (SD)	Mean (SD)	Mean (SD)
Age	27.49 (5.33)	28.85 (3.48)	27.89 (4.97)
Parity	3.05 (2.69)	1.77 (1.96)	2.74 (2.58)
Interval between previous ectopic and new pregnancy (months)	12.56 (23.33)	21.33 (14.88)	11.60 (10.94)
Known predisposing factors	n (%)	n (%)	n (%)
IUCD use	11 (27)	0 (0)	11 (20)
Not identified	22 (54)	0 (0)	20 (37)
Previous PID	3 (7)	1 (8)	4 (8)
Previous pelvic surgery	5 (12)	1 (8)	6 (11)
Previous ectopic pregnancy	0 (0)	13 (100)	13 (24)
IUCD - Intrauterine contraceptive device; PID - pelvic inflammatory disease; n = number; SD - standard deviation			

Table 2 - Age distribution in relation to subsequent pregnancy.

Age distribution	Intrauterine pregnancy (n)	Extrauterine pregnancy (n)	TOTAL
15-20	5	0	5
21-25	10	2	12
26-30	15	8	23
31-35	9	2	11
36-40	2	1	3
Total	41	13	54
Mean (SD)	27.49 (5.33)	28.85 (3.48)	27.81 (4.95)
t-value	0.86 NS		
n - number; SD - standard deviation; NS - not significant			

Table 4 - Parity distribution in relation to subsequent pregnancy.

Parity distribution	Intrauterine pregnancy (n)	Extrauterine pregnancy (n)	TOTAL
0	8	5	13
1-4	23	6	29
5-8	9	2	11
9	1	0	1
Total	41	13	54
Mean (SD)	3.05 (2.69)	1.77 (1.96)	2.74 (2.58)
t-value	1.581 (NS)		
n - number; SD - standard deviation; NS - not significant			

months increase in the interval between previous ectopic and current pregnancy. However, the probability is decreased by 0.38 for each order increase in parity. These findings are statistically significant, where the model $X^2 = 14.917$ ($p=0.0019$). The model succeeded in 80% of correct classification of cases, being more accurate for classifying intrauterine (93%) than extrauterine (38%) pregnancies. The model explained approximately 36% of variations associated with the occurrence of ectopic pregnancy.

Discussion. Ectopic pregnancy being a nightmare to the reproductive aged woman remains an enigma. While maternal mortality is a known sequelae, those who survive are prone to another ectopic pregnancy if they desire a new pregnancy. The fertility rates following ectopic pregnancy have been quoted to be between 80-60%¹²⁻¹⁴ although lower rates have been reported.^{15-18,19} It is said that this divergence of results could be explained partly by the antecedent pelvic infection whose prevalence

varies from location to location. The pregnancy rate in these patients is poor. In our study, the pregnancy rate following previous ectopic pregnancy was 43%. This figure is similar to that quoted in another study conducted elsewhere in the Kingdom of Saudi Arabia.²⁰ However this figure might not be real as some of the initial 130 patients were lost to follow-up. Our environment is a vacation resort and as such it may not be that easy to follow-up patients for a considerable length of time. It was thought some time back, that the optimum treatment for ruptured ectopic pregnancy was salpingo-oophorectomy.²¹ The rationale being that if ovulation occurred on the side of the patent tube, the chances of pregnancy would be increased while reducing the risk of a repeat ectopic pregnancy. However this suggestion was not supported by others^{12,15} and is not the current practice.

The main focus of this study were the 54 patients who became pregnant following salpingectomy by laparotomy for ectopic pregnancy. There were 41 intrauterine pregnancies (80%) and 13 repeat ectopic pregnancies (20%). It is known that the risk of a repeat ectopic pregnancy is increased 7 to 13 fold

Table 3 - Age distribution in relation to interval between previous ectopic and new pregnancy.

Age distribution (years)	0-6 months	7-12 months	13-18 months	19-24 months	25-30 months	31-36 months	60 months
15-20	3	1	1	0	0	0	0
21-25	6	5	1	0	0	0	0
26-30	11	5	3	3	0	1	0
31-35	2	4	2	1	0	1	1
36-40	0	2	1	0	0	0	0
r = (-0.012) NS (r = correlation coefficient) NS - not significant							

Table 5 - Parity distribution in relation to interval between previous ectopic and new pregnancy.

Parity	0-6 months	7-12 months	13-18 months	19-24 months	25-30 months	31-36 months	60 months
0	5	3	2	1	0	1	0
1-4	11	7	3	2	0	1	1
5-8	4	5	1	1	0	0	0
9	2	2	2	0	0	0	0

r = (-0.115) NS (r = correlation coefficient) NS - not significant

while the chance that a subsequent pregnancy would be intrauterine is 50-80% and the chance that the pregnancy will be tubal is 10-25%.⁷⁻⁹ Glock et al²² in their study showed that the risk of a 3rd ectopic gestation is less than an intrauterine pregnancy. One is very curious to know about the factors that make another ectopic pregnancy more likely. This is very pertinent, especially in developing countries where the latest advances in reproductive technology are still a mirage. Few studies have shown that recurrent ectopic pregnancy rates are lower after laparoscopic surgery than after the conventional laparotomy.¹¹ Unfortunately, in this part of the world, the laparoscopic method of managing ectopic pregnancy is still limited to the very specialized centers. From the study of Gruft et al,²³ they did not find any significant association between recurrent ectopic pregnancy and age of the patient, history of previous ectopic pregnancy, non intact contralateral tube and salpingectomy. However, from our logistic regression models, we were able to deduce that the chance of a repeat ectopic pregnancy increases as the age of the patient and interval between the previous ectopic and new pregnancy increase. In the series of Nagamani et al,¹⁵ all of the repeat ectopic pregnancies occurred in patients under the age of 25 which could be related to the fact that more patients in this younger age group had previous pelvic infection. This of course is at variance with the result in our

Table 6 - Logistic regression models for risk factors influencing the recurrence of ectopic pregnancy.

	B value	Odds ratio
Extrauterine pregnancy =	-3.1616 (constant)	nil
	+ 0.0511X age (years)	1.05
	+ 0.0101 X interval between previous ectopic and new pregnancy (months)	1.11
	- 0.3840 X parity	0.68
Model $X^2_{(3)} = 14.917$ (p = 0.0019)		

study population. One fact that stands out is that the incidence of pelvic infection is still comparatively lower in our environment than those in the developed countries possibly as a result of the culture and tradition of the society. In our series only 4 out of the 54 (7%) patients who had a pregnancy following ectopic pregnancy had a history of pelvic infection whereas about 31% of patients in Nagamani's study had pelvic infection as the etiological factor for the ectopic pregnancy.¹⁵ This may explain the disparity in our findings. We have also shown from our study that the parity of the patient negatively correlates the risk of another ectopic pregnancy; i.e as parity increases, the chances of repeat ectopic gestation, decreases. In our series, 4 (30%) of the patients with repeat ectopic pregnancy were nulliparous. The future childbearing capacity of these patients might have been severely jeopardized because they had repeat salpingectomy due to ruptured tubes as artificial reproductive technology (ART) is not readily available in our environment. As a result they may be destined to a life of misery and depression. However the situation may change if and when the laparoscope is used more readily in the treatment of ectopic pregnancy.

We conclude that the older patient with a previous history of ectopic pregnancy who is nulliparous is at a higher risk of having another ectopic pregnancy, especially if the new pregnancy is delayed for some time. Larger studies are advocated to validate these findings.

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