THE CESAREAN SECTION RATE IN CASES WITH PREMATURE RUPTURE OF MEMBRANE (PROM) AT 36TH WEEK OF PREGNANCY OR LATER

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Abstract- ***Premature rupture of membrane (PROM) is one of the complications of pregnancy which is blamed for increasing the rate of cesarean. Therefore, we studied pregnant women who were admitted in Shariati hospital during March 1996 and March 2000, to determine the rate of cesarean delivery in cases with PROM after 36th week of pregnancy (Term PROM). In a retrospective study, we included pregnant women who had these criteria:***

1- PROM 2- Gestational age≥36 weeks 3- Single pregnancy 4- cephalic presentation and 5- no prior history of cesarean delivery. We extracted their demographic factors, age of pregnancy, induced labor its absence, interval duration between the onset of PROM and induction of labor, interval duration between the onset of PROM and normal vaginal delivery or cesarean delivery, the circumstances of cervix before beginning of induction of labor, type of delivery, indications of cesarean section and new born weight, from their files and entered them in a check list.

We reviewed 7544 cases and only 536 cases matched to our criteria and were registered. The Rate of PROM and cesarean delivery in the study group was 7.5% and 28.06%, respectively. Indications of cesarean section contained: Fetal distress, 30.8%; CPD, 27.3%; Failure to progress, 18.6%; High risk pregnancy, 16.9% and Macrosomia, 6.4%. The rate of cesarean section decreased significantly when cervix dilatation or effacement (each alone) increased (Dil, $p=5\times10^{-7}$; Eff, $p=7\times10^{7}$). Interval duration between the rupture of amniotic sac and the onset of induction had no effect on the cesarean rate (p=0.58). An increase in induction cases did not increase the rate of cesarean section ($p<10^{-7}$). PROM at 36th week of pregnancy and later did not increase the chance of cesarean delivery, and neither did an increase in induction rates. Longer interval duration between rupture of membranes and onset of induction played no role in decreasing the rate of cesarean section but it is possible to shorten hospitalization time by decreasing that interval duration without increasing cesarean rate. Thus, we suggest immediate induction of labor in the term PROM. PROM at 36th week of pregnancy and later didn't increase the cesarean rate.

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INTRODUCTION

As a part of natural delivery, the rupture of membrane happens, but if it happens before the onset of labor, it will become PROM. PROM happens in 5-10% of the entire deliveries (1-2). If it happens at 36th week of pregnancy or later, the goal is to deliver the patient. If the labor follows the rupture of membrane the better and if there is no onset of labor, it must be induced and if it is not successful or in the presence of complications, the mother should under go cesarean section.

We studied PROM as an indication of cesarean section because of its high prevalence, obscure etiology, diagnostic problems, fetal and maternal complications, management problems and its mortality.

PROM causes great problems such as increase in the rate of induction of labor, unsuitable cervix at the onset of induction, probable induction failure, fetal distress, fetal and maternal infection, cesarean section, and its complications (post partum metritis,…) (1,3), longer hospitalization duration and patient's increased expenses.

To determine the rate of cesarean delivery in cases with PROM and to find the answer whether the interval duration between the rupture of amniotic sac and the onset of labor (spontaneous or by induction) has any effect on the rate of cesarean section or whether increase in the induction rate increases cesarean rate, we studied the pregnant women in Shariati hospital during March 1996 and March 2000.

MATERIALS AND METHODS

In a retrospective study, we studied all the deliveries in Shariati hospital in the duration

mentioned above and included the cases with the following criteria: 1- having PROM 2- gestational age≥36 weeks 3- single pregnancy 4- cephalic presentation 5- no prior history of cesarean delivery in the study. In addition to the above criteria, we entered the patients demographic factors, gestational age , induced labor or its absence, interval duration between rupture of membranes and the onset of induction, interval duration between the rupture of membranes and the normal vaginal delivery or cesarean section, cervix circumstances before beginning of induction (dilatation, effacement, station, position, consistency), type of delivery, indications of cesarean section (if underwent) and newborn weight in a data sheet form. X^2 test was used for analysis and $p<0.05$ was considered statistically significant. The data sheet forms were classified and the data were extracted and presented in graphs or listed in tables, and the role of PROM in cesarean section judged statistically.

RESULTS

Totally, we reviewed 7544 files and among those, 569 files matched to our criteria. PROM prevalence was 7.5% in our cases. We excluded 6 incomplete files. 158 cases underwent cesarean section from the 563 cases with PROM thus the prevalence of cesarean section was 28.06%. Type of delivery according to the different maternal age groups is listed in table 1 and shows significant increase in the rate of cesarean section in mothers 30 years old or older (p=0.0007). There was no record about maternal age in 3 files of cesarean section cases and 4 files of normal vaginal delivery.

Out of the whole cases, 232 were nullipara and 231 were multipara and the rate of cesarean section was 34% and 19.5%, respectively and the difference was significant (p=0.0001).

The indications of cesarean section has been presented in Fig. 1 and shows that fetal distress has the highest rate in the cesarean indications (30.6%). The rate for other indications of cesareans section was: CPD (27.3%), failure to progress (18.6%), high risk pregnancy (16.9%) and macrosomia (6.4%).

The effects of induction, listed in table 2, shows that the rate for cesarean section is lower in induced labor than in those without it. (15% and 41%, respectively) and this difference is statistically significant ($p<10^{-7}$).

The effect of interval duration between the rupture of membrane and the onset of induction on the type of delivery, listed in table 3 showed that if the onset of induction was 6 hours before the rupture of membrane, 12% of cases underwent cesarean section. This rate was 17% and 15% in the cases with interval duration of 6-12 hours and more than 12 hours, respectively which was not statistically significant (p=0.58).

The effects of cervical dilatation on the type of delivery listed in table 4 and shows that the rate of cesarean section in 2 cm and lesser dilatation, 3-4 cm and more than 4 cm was 38%, 25.5% and 11%, respectively and it means that the rate for cesarean section is decreased when the dilatation increased ($p=5\times10^{-7}$).

In seven files of cesarean delivery, no cervical data was presentend.

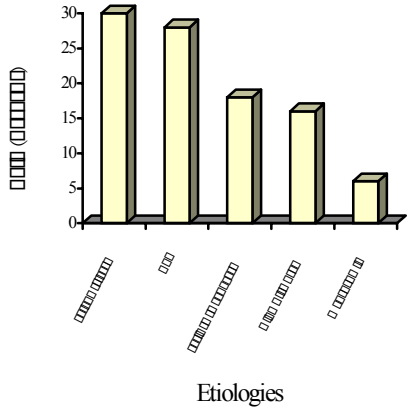

Fig. 1. The distribution of 158 cases underwent cesarean section according to the different indications

Table 1- Type of delivery according to different maternal age groups, Shariati hospital, 1996-2000

Maternal age / Type of delivery	15-19	20-24	25-29	30-34	≥35
NVD	49 78%	163 78%	119 74%	45 55%	25 61%
C/S	14 22%	47 22%	41 26%	37 45%	16 39%
Total	63 100%	210 100%	160 100%	82 100%	41 100%

The effect of cervical effacement on the type of delivery listed in table 5 showed that the rate of cesarean section was 53%, 29%, 25.5% and 5% in the cervical effacement of 0-25, 25-50, 50-75 and 75-100, respectively. It means that the cesarean rate decreases significantly with increasing cervical

effacement ($p=7\times10^{-7}$). There was no data about cervical effacement in 7 files of cesarean delivery.

Table 2. Type of delivery in the induced labor and not induced, Shariati hospital, 1996-2000

Type of Delivery / In duced labor	NVD	C/S	Total
No	169 59%	116 41%	285 100%
Yes	236 85%	42 15%	278 100%

Table 3. Type of delivery in different interval duration between the rupture of membranes and the onset of labor induction, Shariati hospital, 1996-2000

Type of Delivery / Time	NVD	C/S	Total
Less than 6 h	74 88%	10 12%	84 100%
6-12 h	107 83%	22 17%	129 100%
More than 12 h	55 85%	10 15%	65 100%

Table 4. Type of delivery according to cervical dilatation, Shariati hospital, 1996-2000

Type of Delivery / Cervical Dilatation	NVD	C/S	Total
0-2 cm	132 62%	81 38%	213 100%
3-4 cm	167 74.5%	57 25.5%	224 100%
>4 cm	106 89%	13 11%	119 100%

Table 5. Type of delivery in different cervical effacement Shariati hospital, 1996-2000·

Type of Delivery / Cervical effacement	NVD	C/S	Total
0-25	21 47%	24 53%	45 100%
25-50	175 71%	72 29%	247 100%
50-75	152 74.5%	52 25.5%	204 100%
75-100	57 95%	3 5%	60 100%

The role for Bishop score in the type of delivery listed in table 6 shows no significant relation between the cesarean rate and Bishop score (p=0.715).

In most of the files, all of the Bishop score parameters had not been registered, and this could be one of the reasons.

The rate for newborn weight listed in table 7 shows that the rate for cesarean delivery is 23%, 24%, 23% and 33% according to the newborn weight of less than 2500 g, 2500-3000 gm, 3000-3500 gm and 3500-4000 g, respectively.

The cesarean rate increased mainly in newborn weight of almost over 4000 g that was statistically significant ($p=10^{-5}$). There was no record about newborn weight in 3 files of cesarean section and 2 files of normal vaginal delivery.

Table 6. Type of delivery in different Bishop score, Shariati hospital, 1996-2000

Type of Delivery / BS	NVD	C/S	Total
Unfavorable 0-4	30 71.5%	12 28.5%	42 100%
Intermediate 5-7	21 77.7%	6 22.2%	27 100%
Favorable 7>	9 82%	2 18%	11 100%

Table 7. Type of delivery according to the different newborn weight, Shariati hospital, 1996-2000

Type of Delivery / Newborn weight	NVD	C/S	Total
<2500 gm	23 77%	7 23%	30 100%
2500-3000 gm	123 76%	39 24%	162 100%
3000-3500 gm	160 77%	49 23%	209 100%
3500-4000 gm	93 67%	46 33%	139 100%
>4000 gm	4 22%	14 78%	18 100%

DISCUSSION

The rate of PROM in our population study was 7.5%. Some studies have reported it to be 5-10%. The rate of cesarean section in cases with PROM at 36th week of pregnancy and later was 28.06%. According to the reports from obstetrics ward of

Shariati hospital in 1999-2000, the rate of cesarean delivery was 46.6%, thus PROM at 36th week of pregnancy or later can not play a role in increasing the cesarean rate.

The major indications for cesarean delivery in cases with PROM after 36th week of pregnancy in our study included fetal distress 30.8%, CPD 27.3%, failure to progress in labor 18.6%, high risk pregnancy 16.9% and macrosomia 6.4%.

In our study, the rate of cesarean delivery increased in the age group of 30 years and older and this matches with other studies (such as Hansen (1986), Adashek and colleagues (1993) and Edge and Laros (1993) (4-6)). In addition, in our study the rate for cesarean section in nulliparas was more than multiparas which is matched with Hansen (1986) and Hannah (1999) studies (4,7). The rate of cesarean section in induced labor cases was less than the other group but in Duff's and colleagues, Grant and colleagues and Guise et al, the cesarean rate was reported more in the cases with induction of labor (2,8-9). Although, Wagner and colleagues and Shalev et al reported no difference between induced and not induced labor (10-11).

In this study, interval duration between the rupture of membranes and the onset of induction had no effect on the cesarean rate. Kappy and colleagues, Wagner et al and Shalev and colleagues reported the same results (10-12). But Grant and colleagues believed that the rate of cesarean section decreased if interval duration between the rupture of membranes and the onset of induction increased (8) and Hallak and Bottoms suggested to decrease the interval duration between the rupture of membranes and onset of induction in term PROM (specially in cases who underwent digital vaginal exam) and reported that the cesarean rate would decrease by decreasing this interval duration (13). We concluded that the rate of cesarean section decreased if cervix dilatation and effacement had better circumstances but because of incorrect Bishop score parameters registration such as cervical station and consistency, there was no significant relation between type of delivery and Bishop score. In this study, the rate of cesarean section increased as newborn weight increased to over 4000 gm which is in accordance with literature (3).

In conclusion, according to this study and other researches, it can be concluded that: PROM at 36th week of pregnancy or later can not increase the rate of cesarean section and neither does the induction of labor. Long interval duration between the rupture of membranes and the onset of induction has no effect on the cesarean rate and by shortening this interval duration, it is possible to decrease hospitalization period without an increase in the rate of cesarean section, thus we suggest to start the induction of labor immediately in cases of term PROM without attention to the rupture interval duration.

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