

LABOUR TERMINATION AND PERINATAL OUTCOME IN PREGNANT WOMEN WITH PLACENTA ABRUPTION WITH PPROM AND PROM

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Placenta abruption is an obstetric accident which endangers life and health of both mother and embryo. It is one of the most serious obstetric complications, whose incidence varies from 4.9-12.9 per 1,000 labors, and according to frequency, it stands for the second cause of perinatal death. Retrospective analysis included the interval from 1996 to 2005. Total number of labors was analyzed and it was 32,358. In addition, the number of labors complicated by placenta abruption was analyzed, and it was 119 or 0.37%. The incidence of placenta abruption according to age of pregnancy and the integrity of embryonic membranes was also analyzed. It was established that there was no statistically significant difference in the incidence of placenta abruption appearing in pregnant women with and without the embryonic membranes disruption. Furthermore, the patients' age was analyzed, and it was determined that the patients with placenta abruption and PPROM were 5 years older than those with placenta abruption without PPROM, and that this difference was very significant. Disruption duration was analyzed as well as the time from the first uterus bleeding to labor. The difference between PPROM and PROM duration was statistically significant, as well as the difference in duration between spontaneous and artificial rupture of embryonic membranes. The way of labor termination was analyzed in pregnant women with verified placenta abruption. In 84.87% of patients, the labor was terminated by Caesarian section, and only 15.13% by vaginal labor. The perinatal outcome was also analyzed, according to Apgar score at one and five minutes after delivery. Apgar score shows that out of the total number of abruptions, 12 neonates were born dead (10.08%), 24 (20.17%) in good condition (Apgar score >7), 56 (47.06%) were marked 4-7, while 27 (22.69%) were in hard asphyxia (Apgar score 1-3). *Acta Medica Medianae 2007; 46(3):5-9.*

Key words: *placenta abruption, PPROM, PROM, Caesarian section*

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Introduction

Placenta abruption is an obstetric accident which at the same time jeopardizes health and life of both mother and embryo. It is one of the most serious obstetric complications. It is estimated that the incidence of abruption varies from 4.9 to 12.9 per 1,000 labors, and that, according to frequency, it stands for the second cause of perinatal death (4,17). Premature abruption of normally inserted placenta complicated every 150th labor. However, by applying modern principles of antenatal protection, the number of premature placenta abruptions has decreased, while the most dangerous form (Couveler syndrome) is very rare nowadays (1).

Every incomplete or complete abruption, i.e. separation of normally inserted placenta before the third labor age is the premature placenta

abruption (*abruptio praecox placentae insertio normalitas*) (12). Although it can appear in the first and the second labor age, it can also appear during pregnancy before labor. Premature abruption of normally inserted placenta is characterized by certain symptoms and the degree of difficulty, so according to general state of both the pregnant woman and embryo there are:

1. light degree
2. middle hard degree
3. hard degree (1,4)

According to bleeding as the crucial symptom of every premature abruption of normally inserted placenta, types of bleeding are described:

1. external, visible bleeding
2. internal, invisible
3. combined, internal and external bleeding (1,4)

Etiology of placenta abruption is unknown. Although this unfortunate incident includes many risk factors, clear causal relation still needs to be established (11). However, the familiar reasons could be divided into direct and indirect. Direct reasons are: hit, fall, (15), uncomfortable drive on a bumpy road or any insult in abdominal or genital area. Indirect reasons are: hypertension, eclampsia, poor nutrition, high parity, myoma-

changed uterus, advanced reproductive age, smoking, cocaine, PPRM and PROM. (13,15).

Possible factors can also be recent amniocentesis, short umbilical cord, placenta abruption in previous pregnancy and dietary insufficiencies. Hypertension, chronic and pregnancy-induced, is often mentioned as a risk factor. Furthermore, age of the mother seems to be important in placenta abruption, as well as multiparity, suboptimal body weight of a pregnant woman, chorioamnionitis and inadequate or missing prenatal control (4,8). Higher degree of placenta abruption and consequential retroplacental bleeding, i.e. of apparition of retroplacental hematoma, brings about a higher possibility for coagulopathy. In some cases, lower degree of chemostatic damage can appear even when placenta abruption is not sufficient to cause fetal death. In case of higher degree of placenta abruption, uterus is usually constantly hard, and baby's heart beatings cannot be heard any more because of intrauterine embryo death. Uterine bleeding, before labor, cannot show accurately the degree of placenta abruption, the amount of blood lost or the presence of chemostasis system disorders. It is possible that a pregnant woman does not bleed, and that there is complete placenta abruption and dead embryo. Placenta abruption in normal labor is quick, and coagulation mechanism activation with myotamponade brings to the closing of uterine circulation. In placenta abruption, completely or incompletely abrupt placenta stays inside the uterus until labor is finished. Meanwhile, blood currency from 500 to 800 ml/min continually comes to placenta. Coagulation stimulus gets into the circulation and it comes to coagulation factor consumption, and thus to the DIK development even after labor termination (14). For all the aforementioned, placenta abruption has to be considered as a very serious obstetric problem that needs great caution of the whole obstetric team, for all possible complications, direct or indirect, which can jeopardize lives of both mother and her child (2,3,10,16). Preterm premature rupture of membrane (PPROM) is a current, very serious problem of perinatal medicine.

Embryo membranes are made of slim amnion and multistratum chorion, with a layer of thick connective tissue between them. Amnion consists of five separate layers. Chorion does not have blood vessels, so it feeds itself from decidual diffusion. Normally, by pregnancy progression, the connection between chorion and deciduas weakens, so the weakened nutrition is one of the possible mechanisms of term rupture of embryonic membranes. Such membranes look normal on histological preparation. Normally built membranes easily stretch before the term and resist intrauterine pressure that does not overcome the amount of 60 mmHg. It is believed that frequent stretching for frequent contractions or increased intrauterine pressure can cause premature rupture of the normally built membranes. Some pregnant women lack collagen structure by birth, therefore are exposed to repeated water breaking, because their membranes are biologically less valuable (7). Normally, the

membranes integrity till the term is provided by the equilibrium of collagen destruction factors (collagen disease, leukocyte esterase, cytokines) and those that stop it (alpha 1 antitripsin). Alpha 1 antitripsin is one of the familiar proteolysis inhibitors, normally present in cervical sector, and the mentioned enzymes are side products of bacterial metabolism present in vagina or appear during mother's immunology reaction to pathogens. The membranes will stay intact if enough antitripsin and other factors neutralize the effect of proteolytic enzymes. Cervix colonization of some sorts of bacteria and especially strong immunology response can cause huge amounts of proteolytic enzymes and materials able to animate the uterus activity (endothelin, interleukins, bacterial endotoxins, cytokines). Then, the amnion rupture and appearance of uterus contractions are unavoidable (5,6). Besides, premature amnion rupture can be caused by: incompetent cervix, polychidramnion, multiple gestation, trauma, pelvic presentation, deflection anomalies, disproportions, placenta abruption, placenta previa, genetic malformations and infections. PPRM is followed by increased risks of maternal/neonatal infections and prolapse of umbilical cord, which are relatively small compared to emphasized respiratory distress syndrome. Preterm premature membrane rupture accounts for 30 to 40% preterm labors. Vintzileos (1985, 1987) and Nelson (1986) reported about the increased frequency of placenta abruption with preterm premature membrane rupture (9,10).

Aims

1. To establish the incidence of placenta abruption at the Clinic of Gynecology and Obstetrics, Clinical Center of Nis.
2. To establishing the way of terminating placenta abruption-complicated labors.
3. To analyzing the perinatal outcome of pregnancies complicated by placenta abruption with PPRM and PROM.

Material and methods

The research was done at the Clinic of Gynecology and Obstetrics, Clinical Center Nis. Backward analysis of clinical materials (labor protocol, labor history, child lists, hystopathologic and autopsy findings) cover the period from 1996 to 2005. The research included 119 labors with placenta abruption. There were pregnant women with monoembryonic pregnancy above 28 weeks of gestation, as well as those who labored before that time with live embryo or embryo weighing more than 1,000 g. The research did not include pregnancies with twin embryos.

Research results were systematized and shown in tables. Depending on the statistical distinction, distribution form and sample numbers, Student's test and X-square test were used.

Results

During the ten-year period, there were 32358 labors at the Clinic of Gynecology and

Obstetrics, out of which 30092 were term and 2266 preterm labors (Table 1).

In the same period, there were 119 placenta abruptions or 0.37%. Out of 119 placenta abruptions, 56 (47,05%) were reported in pregnant women with premature disruption of embryonic membranes, and 63 (52,95%) in pregnant women without disruption. There was no statistically significant difference in placenta abruption incidence between pregnant women with and without disruption of embryonic membranes. ($X^2=0.005$; $p=0.815$; $p>0.05$) (Table 2).

Mean age of pregnant women with placenta abruption was the highest in the group with PPRM (27.89 +/- 2.21), and the lowest in term pregnancies (22.15 +/- 1.75). Pregnant women with placenta abruption with PPRM were usually 5 years older than those with placenta abruption without PPRM. This difference was statistically very significant ($t=7.585$; $p<0.001$). Pregnant women with PROM were on average 5 years older than those with term pregnancies and placenta abruption. This difference was statistically very significant ($t=6.634$; $p<0.001$). Mean age of pregnant women with placenta abruption and preterm labor was 25.40 years, while the mean age of those with term labor was 24.18 years. The difference was not statistically significant ($t=0.936$; $p>0.005$). Pregnant women with placenta abruption and premature rupture of embryonic membranes were older than those with placenta abruption and without preterm rupture of embryonic membranes ($t=9.993$; $p<0.001$). Mean age of the patients with placenta abruption and preterm rupture of embryonic membranes, regardless of pregnancy duration, was 27.05 years. Mean age of all the pregnancies, with placenta abruption without premature disruption of embryonic membranes, was 22.54 years (Table 3). Preterm premature rupture of embryonic membranes (PPROM) in women with placenta abruption preceded the labor for 16.73 +/- 2,98 hours, while that time varied from 11,07 +/- 1,73 hours in the group with PROM. This difference in PPRM and PROM duration was statistically significant ($t=3.151$; $p<0.01$), because the cervix maturity in term PROM-complicated pregnancies measured by Bishop score, was higher than the cervix maturity in preterm PPRM-complicated pregnancies. Premature rupture of embryonic membranes in women with placenta abruption preceded the labor for 13.9 +/- 2.35 hours, while the time between artificial amniotomy and abruption varied from 1.78 +/- 0.46 hours. The difference is statistically very significant ($t=15.544$; $p<0.001$) (Table 4). In 84.87% of pregnant women with placenta abruption, the labor was terminated by Caesarian section, and only 15.13% by vaginal labor (101 pregnant women labored by Caesarian section, and 18 by vaginal labor). Out of the total number of preterm labours complicated by placenta abruption, 53 (86.88%) were terminated by Caesarian section, and 8 (13.12%) by vaginal labor. Out of 58 term pregnancies complicated by abruption, 48 (82.75%) were terminated by Caesarian section and 10 (17.25%) by vaginal labor. There is the diffe-

rence of 7.53% between the way of termination in preterm and term pregnancies, in favor of abdominal way, but it is not statistically significant (Table 5).

Out of 119 newborn babies, 12 were born dead (10.08%), 24 (20.17%) in good condition ($Ap>7$), 56 (47.06%) were marked Ap 4-7, while 27 (22.69%) were in hard asphyxia (Ap 1-3) (Table 6). After 5 minutes, out of 107 liveborns, 31 (26.05%) were marked Ap 1-3, 37 (31.09%) Ap 4-7, and 39 (32.77%) $Ap>8$ (Table 7).

Discussion

Placenta abruption is an obstetric accident which jeopardizes health and life of both mother and embryo. It is one of the most serious obstetric complications (1).

Placenta abruption appears in 0.49 - 1.29% (0.8% on average) of all labors, and it stands for the second cause of perinatal death. The cause of placenta abruption in pregnancies complicated by preterm premature rupture of embryonic membranes stays an enigma. It is probably caused by many factors. The association among multiparity, short umbilical cord, its paracentral insertion, polyhydramnions, hypertension, trauma, uterus tumor with placenta abruption was identified. The role of maternal smoking cigarettes as potential risk factor is suggested by many authors. Trauma is the leading cause of non-obstetric maternal death. Car accidents account for 66% of all the traumas in pregnancy, while 34% refer to falls or some physical maltreatment during pregnancy (10). Concerning the seriousness of the problem and the urgency of the situation, majority of pregnancies complicated by placenta abruption is terminated by Caesarian section, which brings many changes and risks connected to maternal morbidity and mortality. 84.87% of all pregnancies, preterm or term, are terminated in abdominal way (4, 16). Comparing perinatal outcome in patients with placenta abruption with premature disruption of embryonic membranes and those with placenta abruption without premature disruption of embryonic membranes, high incidence of intrapartur death was found in both groups - 10.08% (data about neonatal death miss, because part of jeopardized children was taken to the Institute for Prematurely Born Children). Perinatal outcome is not statistically significantly connected to the way of labor termination. However, prematurity, body mass of the embryo, duration of premature disruption of embryonic membranes and choryamnionity significantly influenced the perinatal outcome, but the difference was not statistically significant. The incidence of intrapartur fetal distress and the incidence of low Apgar score at one and five minutes, were more frequent in pregnant women with abruption and premature disruption of embryonic membranes, but the difference was, again, not statistically significant. This points out to bigger jeopardy of embryos in such pregnancies, even besides usually fast recognition of this complications and urgent obstetric intervention (10,12). Antepartal and peripartal complications

of placenta abruption and PPRM are usually seen in preterm labors. Preceding reports suggest that prolonged premature rupture of membranes can also appear with increased risk of placenta abruption (11).

Some studies pointed out the increased incidence of placenta abruption in pregnancies with PPRM (Nelson and co.-1986, Vintzileos and co.-1987, Moretti and Sibai-1988, Major and co.-1995). Average incidence of abruption, according to their data, is 5,7%. Etiopatogenetic mechanism of premature rupture of embryonic membranes is still not clear. It is suggested that the loss of fluid after membrane rupture brings about the disproportion between placenta and uterus area, which is followed by premature placenta abruption on decidual spon-gial layer. This supposition could also explain how placenta separation develops in the third labor age, after decompression of uterus with polyhy-dramnion or the birth of the first twin. Described mechanism could also explain why some patients after premature rupture of membranes, because of the chronic uterus decompression, have abrup-tion, but not vaginal bleeding. Vintzileos et al. added the clinical evidence to this supposition. They reported the association between strong pain, olygoamnion and placenta abruption in patients with premature rupture of membranes (10).

Conclusion

1.The incidence of placenta abruption at the Clinic of Gynecology and Obstetrics in Nis for the period from 1996 to 2005 is 0.37%.

- 2.Placenta abruption is not more frequent in pregnant women with PPRM or PROM (47,06% placenta abruptions without PPRM or PROM vs. 52,94% placenta abruptions with PPRM or PROM).
- 3.Pregnant women with placenta abruption and PPRM and PROM are statistically older than pregnant women without PPRM and PROM (5 years on average).
- 4.There is statistically very significant difference in time passed from the first bleeding to labour between women with placenta abruption with or without PPRM or PROM.
- 5.Since more of our patients bled after the membrane rupture, our data suggest that the rupture of embryonic membranes as causal factor of abruption in premature disruption of embryonic membranes is more important than the abruption itself.
- 6.Because of urgency situation and maternal and fetal jeopardy, majority of pregnant women laboured by Caesarian section (84.87%). The operation itself, regardless of preceding distress, brings new possibilities for complications, early – direct or late – indirect.
- 7.High neonatal child death and birth-rate with low Apgar score still represent serious and incompletely solved problem of modern perinatology and neonatology.
- 8.Finding of early markers and possibilities for proper selection of pregnant women at high risk of placenta abruption represent the imperative, in order to bring this unfortunate event for a mother, her child, but also the obstetrician to the minimum.

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POROĐAJ I PERINATALNI ISHOD KOD TRUDNICA SA ABRUPCIJOM PLACENTE UDRUŽENOM SA PPROM-OM I PROM-OM

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Abrupcija placente je opstetrički akcident koji istovremeno ugrožava život i zdravlje majke i ploda. Jedna je od najozbiljnijih opstetričkih komplikacija, čija je incidenca od 4,9 do 12,9/1000 porođaja i predstavlja drugi uzrok perinatalne smrti po učestalosti. Retrospektivnom analizom obuhvaćen je vremenski interval od 1996. do 2005. godine. Analiziran je ukupan broj porođaja koji je iznosio 32358 i broj porođaja koji su komplikovani abrupcijom placente koji iznosi 119 ili 0,37%. Analizirana je incidenca abrupcije placente u odnosu na starost trudnoće i integritet plodovih ovojaka. Utvrđeno je da nema statistički značajne razlike u incidenci javljanja abrupcije placente kod trudnica sa i bez dirupcije plodovih ovojaka. Životno doba trudnice je takođe analizirano, gde je utvrđeno da su trudnice sa abrupcijom placente i PPROM-om prosečno starije 5 godina od trudnica sa abrupcijom placente bez PPROM-a. Ova razlika je visoko signifikantna. Takođe je analizirano trajanje dirupcije i vreme od prvog uterusnog krvarenja do porođaja. Utvrđeno je da je razlika u trajanju PPROM-a i PROM-a statistički signifikantna kao i razlika u trajanju između spontane i arteficialne ruptur plodovih ovojaka. Analiziran je način dovršavanja porođaja kod trudnica kod kojih je verifikovana abrupcija placente. U 84,87% trudnica porođaj je dovršen carskim rezom, a samo u 15,13% vaginalnim porođajem. Takođe je analiziran perinatalni ishod na osnovu Apgar skora u prvoj i petoj minuti. Apgar skor pokazuje da je od ukupnog broja abrupcija, 12 neonatusa rođeno mrtvo (10,08%), 24 (20,17%) rođeno u dobroj kondiciji (Apgar skor >7), 56 (47,06%) je ocenjeno Apgarom 4-7, dok je 27 (22,69%) bilo u teškoj asfiksiji (Apgar skor 1-3). *Acta Medica Medianae 2007;46(3):5-9.*

Ključne reči: abrupcija placente, PPROM, PROM, carski rez