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Chapter

Twin Pregnancies Labour Modus and Timing

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Abstract

Twin pregnancies are categorized according to three factors, zygosity, chorionicity and amnionicity. Dizygotic twins are always dichorionic and diamniotic, where each twin has its own chorionic and amniotic sac. Monozygotic twins account for 1/3 of twin pregnancies and show higher morbidity and mortality. In monozygotic twins, chorionicity and amnionicity are determined by the time of zygote division. Chorionicity and amnionicity determine the risks of twin pregnancy. Morbitidies are shown notable decreasing tendency depending on improving of high risk obstetric and neonatal care, however is still discussed the optimum labour management in twin pregnancies Vaginal delivery in twin pregnancies is possible when both have cephalic presentation and in the late weeks of pregnancy during which the risks of prematurity are minimized. The aim of this review was the assessment and evaluation the impact of the labour modus and timing of termination of twin pregnancies due to rise of their occurrence based on scientific aspects of the new published literature on perinatal outcome.

Keywords: twin pregnancies, modus of terminating births, perinatal outcome

1. Introduction

The definition of multiple pregnancies describes the presence of more than one fetus in a single pregnancy. Usually the reference to multiple pregnancies refers to twins, which means that two fetuses coexist in the same pregnancy in one uterus. Twin pregnancy results from the fertilization of two ova from a corresponding sperm (dizygotic twins) or from the fertilization of an ovum after separation of the resulting zygote with the final result of the creation of two embryonic monozygotic

twins. Each fetus is surrounded by two membranes, one external (well known as chorionic) and one internal (well known as amniotic). Possibly, more than two embryos will be created in multiple pregnancies, but the more there are, the less likely to survive in the future. The frequency of multiple pregnancies in the human species can be calculated based on Hellin's rule and therefore the following data emerge: for twin pregnancy 1: 85 (1.18%), for triple pregnancy $1:85^2$ (0.013%) and for quadruple pregnancy $1:85^3$ (0.0061%) [1–4].

The 2/3 of them are polygenic pregnancies and 1/3 are monogenic pregnancies. Regarding twin pregnancies, about 70% are dizygotic and 30% are monozygotic twins. The incidence of multiple pregnancies has generally increased in recent years from 1/100 to 1/60–1/70 births. The exact frequency of twins is very difficult to determine because in the first trimester they have a high frequency of miscarriages, much higher than single pregnancies and compared to that in the third trimester of pregnancy to be doubled. Spontaneous abortion of one twin without affecting the other is often asymptomatic. While the frequency of monogenic pregnancies does not depend on the race, heredity, age of the mother, as well as her ability to fertilize after administration of drugs to induce ovulation, the frequency of polygenesis is influenced by the above factors [1–4]. Twin pregnancies account for 1% to 3.5% of total births and have a 15% perinatal mortality rate. In Greece, the incidence of twin spontaneous pregnancies is about 1% and in women with IVF is about 25%. The percentage of perinatal mortality in the US has been declining from 12.6% in 1980 to 6.8% in 2001, a decrease of 46%. According to the literature, about 50% of twin pregnancies are associated with prematurity and low birth weight. Compared to single pregnancies, twin pregnancies have four times the risk of perinatal mortality, while in triple and upper multiple pregnancies there is up to nine times the similar risk. Especially in adolescent twin pregnancies and twin pregnancies in women over 35 years are 46.28% and 16.68% respectively [1–8].

1.1 Epidemiology

The frequency of monozygotic twins is 3.5/1000 to 4/1000 births or 0.4% of pregnancies completely stable regardless of the mother's age, race and heredity is determined by the analysis of the morphology of the placenta or genotype. The dizygotic twins affected because of follicular growth by levels of follicle stimulating hormone FSH, and luteinizing hormone LH affected by racial hereditary factors. The fluctuation rates of the twin pregnancies considered to be due in dizygotic twins, since monozygotic twins have stable effect 3.5/1000 to 4/1000 births. The frequency of dizygotic twins is associated with multiple ovulation heredity and shows high geographical variation. The incidence of spontaneous twin pregnancies varies around the world, with rates ranging from 8/1000 to 17/1000 births. In particular, it ranges from 57/1000 in Nigeria, 12/1000 in the United Kingdom, 12.4/1000 in Scotland, 4/1000 in Japan. In particular, in the USA there was an increase of 65% from 68339 in 1980 to 125134 in 2002. In particular the twins have a fivefold increased incidence in various parts of Africa as a whole of 1/50 or 16/1000 pregnancies, due to high levels of gonadotropins, about half the incidence in Asia 1/150 averaged 3/1000 pregnancies in particular in the yellow race Japanese 2.4%. The incidence of twin pregnancies is in the white race 1/90 or 8/1000 pregnancies [9–12].

Twin pregnancies are more common in older mothers. There is a positive correlation between increased maternal age and increased FSH secretion. There is an approximately 2% increase in women over 35 years old due to increased FSH levels after 37 years (twin decrease and increase in miscarriages in high interest rates) 2% increase after the fourth pregnancy, regardless of age and frequency of

contact. There is an increase from adolescence to 39 years per year 0.8% per subsequent pregnancy and then a sharp decline, increased rate of uterine anomalies (1:20) [12–14]. The rate of spontaneous conception is increased due to increased FSH and LH during the summer months with a corresponding reduction in winter. Worldwide, the incidence of twin pregnancies is 1/80, which may be due to different levels of gonadotropins. Women with dizygotic twins have statistically significantly increased serum FSH levels during the early follicular phase, as well as an increased rate of FSH release during impulses. With regard to twin pregnancies, there is a direct correlation with the mother's ethnicity, while on the other hand, the father's ethnicity does not affect. In addition, the probability of giving birth to twins is affected by the heredity of the parents, at a rate of 2% on the part of the mother and 0.8% on the part of the father. The various toxic substances present in water and food are also dynamic factors that play a role in the frequency of dizygotic twins. Regarding this fact, in 1988 there was an increase of twins from 3‰ to 20‰ in areas contaminated with polychlorinated hydrocarbons. Finally, in cases of twin pregnancies after in vitro fertilization, 85% of them are dizygotic and 15% monozygotic. The incidence of twins in developed countries is higher than normal due to assisted reproduction methods (IVF, induction of ovulation)) [12–14].
The incidence of twin pregnancies after widespread use of assisted reproduction has increased significantly. From 1/80 pregnancies nearly the frequency has been tripling. Particular the percentage of twin pregnancies using the "in vitro fertilization" (IVF) or" intra cytoplasmic sperm injection" (ICSI) is 18–53%, while with the use of insemination and of controlled ovarian overstimulation (IUI - COH) with induction of ovulation is 6.8% to 11.7% [10–18]. Most twins resulting from assisted reproduction are dizygotic. Significant is the increase in the frequency of twins from 10/1000 births in 1980 to an average of 20/1000 births with the help of assisted reproduction methods. A total of 25% of pregnancy and 1/64 in the United Kingdom are the result of assisted reproduction methods) [14–18]. The incidence of assisted reproductive twins can be significantly reduced depending on the use of the embryo selection method and the selective transfer of an embryo. However, the incidence of monozygotic twin pregnancies after assisted reproduction is higher compared to spontaneous monozygotic twin pregnancies. The incidence of monozygotic twin pregnancies due to assisted reproduction is 0.9%. According to bibliographic sources, blastocyst transfer and maternal age (under 35 years) are associated with an increased risk of both either monozygotic or monochorionic twins after IVF [10–22]. According to literature reports the risk of miscarriage in the first trimester is 43% in twins after spontaneous conception, 51% after assisted reproduction while the respective risk rates of miscarriages are 19% and 21% [10–22]. Twin pregnancy is the result of fertilization of 2 eggs from 2 sperm (dizygotic twins 1.2% of pregnancies) or the division of a fertilized egg by the separation of the zygote into 2 separate entities, forming two embryos that can develop individually (monozygotic twins: 0.4% of births or 4/1000 births) [10–22]. The incidence of monochorionicity due to IVF is 3.2% [10–22]. The percentage of monozygotic twins is stable, in contrast the percentage of dizygotic twins depends on race, various genetic factors, mother's age, endogenous gonadotropins, sex fetus and the use of assisted reproduction methods [10–22].

2. Diagnosis

Imaging of the chorion from 5 to 6 weeks after LMP (Last Menstrual period).
Imaging of the fetal poles from the 7th week after LMP.
Fetal heartbeat from the 7th week after LMP.

and in transvaginal ultrasound we have:
Imaging of the chorion from the end of the 4th week after LMP.
Imaging of the amniotic sacs from the 5 'week after LMP.
Imaging of fetuses from the end of the 6th week after LMP.
Fetal heart rate from the 6th week after LMP.

Ultrasound monitoring of a twin pregnancy has two main objectives: to determine the chorionicity and zygosity of the pregnancy due to the higher risk of conceiving a chromosomally abnormal fetus compared to single pregnancies, the risk of twin-twin transfusion syndrome and intrauterine growth restriction.

In particular, the determination of chorionicity that is easier between 11 and 13 weeks (identification of placental points L and T, number of amniotic sacs) is a prerequisite for monitoring twin pregnancies, early detection FFT syndrome, screening for congenital abnormalities. It is often difficult to diagnose monoamniotic twins because it is difficult to visualize them due to the small thickness of the membrane or in cases of oligamnion. The existence of entangled umbilical cords confirms the existence of a single amniotic cavity. The estimation of the thickness of the diaphragm has 83% prognostic value for dichorionic pregnancy, in cases of thin membrane 83% prognostic value for monochorionic diamniotic pregnancy. In dichorionic pregnancies, two placentas are visualized but in monochorionic pregnancies when two layers are detected during the examination of the diaphragm, then these are monochrorionic diamniotic pregnancies, if they are four layers then these are dichorionic diamniotic pregnancies. Ultrasound examination in twins with a single placental mass in the presence of a triangular protrusion of the placental tissue, a peak sign of a twin pregnancy or a lambda or a double apex indicates the existence of two placentas therefore a dichorionic, diamniotic pregnancy. In cases of non-detection of the lambda point but certification of the T sign at the membrane entrance, it indicates monochorionic twin pregnancies. In monochorionic placentas the selective discontinuation of one twin leads to an increase in thromboplastin and poses a risk of amniotic fluid embolism for both the other fetus and the pregnant mother. Fetuses of different genders are always dichorionic and diamniotic. The initial measurements of twin fetuses based on Crown-rump length (CRL) and nuchal translucency do not differ from those of single pregnancies. Amniocentesis is the method of choice in many cases. The rate of spontaneous abortion after amniocentesis does not differ in twin pregnancies achieved by assisted reproduction methods compared to those achieved by spontaneous conception. In pregnancies achieved through assisted reproduction technology, there are high levels of β-HCG with an increased rate of premature maturation and also an increased rate of placental abnormalities, as well as a vaginal spotting. Twin pregnancies have a higher rate of aneuploidy [22–30].

2.1 Monitoring of multiple pregnancy

Chorionicity should be determined on the first ultrasound at the first visit. Possible prenatal screening problems should be highlighted, several visits are necessary for intensive monitoring of both the pregnant mother and the fetus.

2.1.1 Frequency of visits

2.1.1.1 Monochorionic/diamniotic twins

Every 2 weeks until the 16th–24th week of pregnancy in order to exclude TTTS. Especially, during 18th week of pregnancy it should be performed for a detailed

examination of fetal development and during 22–24 weeks of pregnancy for a detailed fetal heart ultrasound. After 24th week, until 32nd week of pregnancy, it should also be performed every 2 weeks, and after 32nd week of pregnancy it should be performed every week until the time of delivery, in order to evaluate in time the possible pathology of the intrauterine fetal development.

2.1.1.2 Estimated fetal weight (EFW)

A difference of estimated fetal weight between 2 embryos less than 25% is considered to be normal.

2.1.1.3 Monochorionic/monoamniotic

The frequency of visits for these twins is mainly determined by the course of the pregnancy and the follow-up should be more frequent because of the fact that the possible complications occur at higher rates, including TTTS and umbilical cord compression [22–30].

2.1.1.4 Dichorionic

18 weeks detailed fetal development test.

22–24 weeks detailed fetal heart ultrasound.

Every 2 to 4 weeks from the 24th to the 32nd week and every week until the birth to assess intrauterine development pathology in a timely manner.

EFW A difference of less than 25% between the EFWs of the two fetuses is considered normal.

Regular testing for hypertension (preeclampsia) should be done to avoid intravenous medication. The early diagnosis of gestational diabetes mellitus is done with increased glucose curve (increased complications in multiple pregnancies).

During these visits, weight gain, blood pressure and changes in the cervix (ultrasound or vaginal examination) should be carefully recorded.

In addition to the amniotic fluid index (AFI), important Doppler ultrasound indicators are: Doppler flow rate tachycardia (UA), umbilical artery pulse index (UAPI), middle cerebral artery Doppler, venous duct (DV) [22–30].

2.2 Complications of twin pregnancy

2.2.1 Maternal complications

Maternal complications in multiple pregnancies occur at higher rates compared to single pregnancies.

2.2.1.1 Hyperemesis

Hyperemesis appears due to increased placental mass and increased β-HCG levels. It is increasing and is a previous complication.

2.2.1.2 Preeclampsia

Compared to a single pregnancy, when there is an increased chance of pre-eclampsia, it doubles and quadruples. Atypical preeclampsia without hypertension is also common, but with hepatic and renal disorders. The incidence rate is

8.1% in dichorionic embryos, 6% in monochromatic ones, while respectively it is only up to 5% in single pregnancies. If other aggravating factors coexist, such as advanced maternal age of first pregnancy and BMI ≥35 Kg/m2, then 75 mg aspirin is recommended.

2.2.1.3 HELLP syndrome

As an acute fatty liver of pregnancy reaches a 9% incidence in twin pregnancies, in contrast to a single pregnancy it is only 0.9%.

2.2.1.4 Anemia

Anemia particularly iron deficiency anemia due to increased plasma volume without being fully explained. Possible cause of hospitalization.

2.2.1.5 Gestational diabetes

The incidence is 14% in twin pregnancies and 8% in single pregnancies.

2.2.2 Bleeding during pregnancy and postpartum bleeding

Low lying placenta or placenta previa are more common in twin pregnancies. Placenta abruption is also more common is multiple pregnancy than it is in single pregnancies. Twin pregnancies cause uterus overdistention, which results in 10% of the cases in uterine atony. Umbilical umbilical cord bulging is ten times more common in twins than in singleton pregnancies. Velamentous umbilical cord insertion is ten times more common in twin pregnancies than in single pregnancies.

2.2.3 Other complications

Bleeding (10% risk of uterine atony)
Transfusion
Endometritis
Increased incidence of umbilical cord prolapse (9 times more frequent versus single and 8.5% in twin pregnancies)
Solitary umbilical artery (3 times more frequent than single pregnancy)
Velamentous cord insertion (10 times more frequent than single pregnancy)
Increased Morbidity (8 times more frequent versus single) [30–34].

2.2.4 Fetal complications

Preterm labor
Low birth weight
High rate of fetal respiratory distress
Risk of cerebral palsy 4.5 times higher than in single pregnancies
Prematurity, respiratory distress syndrome and neonatal infections are the main causes of neonatal mortality.
Selective reduction in dichorionic twin pregnancies is recommended to be performed in the 12th week of pregnancy or in the 20th week of pregnancy.
Selective reduction at 12 weeks of gestation the abortion rate is 5% and the prematurity rate less than 33 weeks is 6%.

Selective reduction at 20 weeks the abortion rate is 14% and the prematurity rate less than 33 weeks is 20% [31–38].

3. Complications in monochorionic twins

3.1 Pathology of fetal weight develpoment

In about 10% of monochorionic twins, there is an uneven distribution of placental tissue between the fetuses and therefore a pathological increase in the weight of one fetus from the second trimester of pregnancy.

3.1.1 Twin to twin transfusion syndrome (TTTS)

In the placenta of monochorionic twins there are vessels - anastomoses on the surface of the placenta. Through these vessels there is an uneven distribution of blood between the two embryos, with one embryo receiving much more blood than the other. As a result, there is a difference in amniotic fluid, with the bigger fetus having increased amniotic fluid and the smaller fetus having very little fluid. TTTS observed only in monochorionic twin pregnancies due to the existence of vascular anastomoses and therefore common fetal circulation. In this syndrome there are intraplacental arteriovenous anastomoses (and more rarely arterial–arterial anastomoses without arteriovenous anastomosis), in which the blood deviates from one twin (donor) to another (recipient). Its incidence is 4 to 35% of monochorionic pregnancies and it shows high rates of perinatal mortality>50%. The diagnosis is ultrasound, usually between 16 and 26 weeks. 1 in 10 monochorionic twins will develop TTTS syndrome [34–40]. However, vascular anastomoses occur in>95% of monochorionic pregnancies. After some time, the twin recipient fetus shows great growth for gestational age (macrosomia, organomegaly), is profuse and hydropic and shows polycythemia, hypertension, congestive heart failure and hydramnios. The donor shows anemia and hypovolemia and, ultrasound, shows growth restriction and oligohydramnios. In TTTS, detected by some of the above characteristic manifestations from the first weeks of the second trimester, the perinatal mortality of both twins is almost 100%. Along with previous ultrasound findings, the hydropic placenta was described as the first manifestation of TTTS. The intense hydramnios of the recipient could be treated with drainage amniocentesis, which may result in>50% survival for both twins. Often, a drainage amniocentesis is sufficient but a repeat amniocentesis may be required. In recent years, with the help of embryoscopy, laser anatomy of the anastomoses is performed. The procedure involves a risk of miscarriage/premature birth at a rate of 10–15% within the next 6 weeks of surgery [34–38]. However, after this operation, an increased incidence of congenital heart disease was reported in both recipient and donor twins. Rarely, there may be similar development of twins and a normal amount of amniotic fluid in both sacs. Selective termination of a pregnancy is one of the possible "therapies." Interventions (along with hydramnios drainage and photocoagulation of anastomoses) with a potentially increased risk of other pregnancies from possible embolism. It has been argued that the donor's death will stop the transfusion into the recipient while in the recipient killing there is a risk of increased resistance to the vascular network of the placenta, which will burden the already anemic donor. Dying of a fetus has the most serious risk of diffuse intravascular coagulation (usually after a few weeks). An extreme manifestation of TTTS is the presence of a normal anatomically

twin donor ("twin pump" [TP]) who usually has a large heart and signs of heart failure (resulting in mortality>50%) and "transfuses" blood (with arterial–arterial placental anastomosis). In a cardiac receptor twin (1% of monochorionic twin births) that does not have a direct vascular connection to the placenta (twin reversed arterial perfusion [TRAP]). The Acardiac twin (AT) recipient usually has other, very serious, anatomical abnormalities (Acardiac monster) (may be brainless or headless) while the normal fetus (if it survives) after birth usually has, remission of signs of heart failure. Transfusion from fetal donor to embryo recipient is done through anastomoses especially through arterial artery and less venous anastomoses in the placenta. The etiology of TRAP syndrome is reported to be either non-conformation of the fetal heart or reversal of blood flow leading to heart aplasia. In a continuing pregnancy, with TRAP, 1–2 times a week ultrasound monitoring of AT is recommended to look for hydrops. With the same frequency, Doppler should be performed in the DA to look for abnormalities of the umbilical artery, umbilical vein and venous pore. Given the increased risk of preterm birth, corticosteroids should be administered between 24 and 34 weeks of gestation (WG). As a prenatal treatment, amniotic fluid (due to coexistence and hydramnios) was removed in the past, the cardiac duct was removed by "caesarean section" (uterine cross-section) or alcohol was administered into the umbilical cord of the AT. Today, among other treatments (waiting or delivery), an attempt can be made to block the umbilical cord circulation of the cardiac twin (BUCCT). In particular, between 18 and 27 WG, BUCCT can be performed using laser, bipolar diathermy or the use of "radiofrequency ablation (RFA]), which are performed under local anesthesia and administration ofconscious sedation. Usually, under ultrasound control, a 2–3 mm fetoscope is inserted into the amniotic cavity (). An alternative but less common method is embryonic umbilical cord ligation [34–40]. Finally, there is a significant risk of structural abnormality in monochorionic twins, with 4% of cases the abnormality concerns only one of the two fetuses. TTTS syndrome is a complication that affects only monochorionic twins and is the most common cause of fetal loss and disability in monochorionic twins. It is characterized by a significant difference in amniotic fluid between the two embryos, increased amniotic fluid around the recipient fetus and minimal amniotic fluid around the donor fetus. The cause of the development of the syndrome is placental vascular anastomoses between the two fetuses. TTTS syndrome occurs in the early stages of pregnancy, when delivery is not an option because the fetuses are still very premature. Therefore, there is significant mortality and morbidity without therapeutic intervention, with possible miscarriage or fetal loss of one or both fetuses [34–40].

3.2 Complications in dichorionic twins

3.2.1 Intrauterine growth restriction (IUGR)

In a 20% of dichorionic twins there is a significant difference in their development, with one of the fetuses not developing well. Probable cause is placental insufficiency in one of the two placentas. This probability is more common when the difference in the development of twins exceeds 18–20% [34–40].

3.2.2 Structural anomaly

The risk of structural abnormality does not increase in dichorionic twins. But since they are two babies, the chance of a structural abnormality in pregnancy, at least in one of the two babies, is twice as high as in a single pregnancy [34–40].

3.3 Monozygotic twins

They show a high frequency of structural anomalies that are classified into three categories.

1. **Conjoined twins** 1/33000 births monoamniotic monochorionic. It can be thoracopagus or omphalopagus. 70% are females.

2. **Congenital abnormalities** resulting from vascular exchange vascular anastomoses in monochorionic placentation.

3. **Acardiac twin** in TTTS, frequency of occurrence 1% of monochorionic twin pregnancies [34–40].

3.4 Cases of intrauterine fetal death of a twin

The risk of intrauterine fetal death is higher in twin pregnancies compared to single pregnancies.

During the ultrasound examination between the 10th and 14th week, the rate of fetal loss in single pregnancies is 2%.

4% in dichorionic pregnancies
1% in monochorionic pregnancies
Intrauterine death of both fetuses
in the first trimester 1.6% in dichorionic twins
2% in monochorionic twins
After the 14th week intrauterine death 2% in dichorionic twins
4% in monochorionic twins
Intrauterine death of both 0.2% sequentially
6% in monochorionic twins
Towards the end of pregnancy risk of endometrial death
1/3333 in the 33rd week of gestation
1/313 35 weeks of gestation
1/69 39 week of gestation

1st trimester of pregnancy vanishing twin common phenomenon no effect on the other twin.

In pregnancies over 20 weeks of gestation there is intrauterine death of a twin 5% of all twin pregnancies.

In monochorionic twins acute hypotension is observed anemia ischemia leading to morbidity or death of the other.

In pregnancies over 26 weeks of gestation risk of imminent death of a twin so there is a need to organize the delivery.

After the death of one twin, administration of corticosteroids to the other twin.

Daily checkup of PT, PTT, Platelets and Fibrinogen is needed. Weekly checkup of biophysical profile and delivery at 37 weeks of gestation is recommended.

The prognosis of the survivor depends on the chorionicity and less on the gestational age at which the uterine death occurred [40–44].

4. Method and time of termination of pregnancy

Abnormal presentations of twins A, B or both are among the common complications during delivery. For the delivery, there should be organization in

the Maternity Hospital and constant vigilance of Obstetricians, Neonatologists and Anesthesiologists, continuous cardiotocographic examination and maximum readiness for the execution of a possible emergency caesarean section. The various presentations of fetuses in twin pregnancies are.

4.1 Vaginal delivery-ceasarean section

In general, both in single pregnancies and in twin pregnancies, the best way to complete delivery is vaginal delivery due to:

1. Development of the newborn's lungs due to the stress of vaginal delivery and therefore less likely to develop pulmonary distress syndrome.

2. In vaginal delivery the bacteria of the normal flora of the mother's vagina settle in the intestine of the newborn and cause activation of the immune system of the newborn. In particular, it is suggested by the American College that in head presentation, regardless of prematurity, cesarean section has no advantage over vaginal deliveries, provided that it was a low-risk pregnancy (No pregnancy pathology such as preeclampsia, intrauterine growth restriction). Regarding intracranial hemorrhage, cerebral palsy, chorioamnionitis there is no influence on the head presentation of the method of termination of pregnancy, only correlation is reported with the degree of prematurity therefore the gestational age of the newborn. In contrast to breech presentation, the rates of cerebral palsy are reported to be increased. According to the American College head presentation in both newborns there is no difference in morbidity of neonates with vaginal delivery compared to neonates born by caesarean section. The views of the American College are confirmed by several studies that concern selected low-risk pregnancies, aged >35 weeks of gestation with a head presentation of the 1st fetus that suggest the choice of vaginal delivery of the 2 fetuses [44–50].

No adverse effects of vaginal delivery were observed with regard to morbidity and mortality of the latter even when its projection is not head-on. After the birth of the first baby, the presentation of the second is often changed, as a result the second twin may have a vertical shape, an abnormal presentation and therefore a caesarean section is preferred. The second twin in case of change of presentation has an increased risk of perinatal asphyxia and therefore the organization of an emergency caesarean section is extremely necessary. Important factors for how to complete the birth of twins are:

Presentation of the first twin

Estimated birth weight

In the majority of cases 75–85% the fetus iswith head presentation and if there are no risk factors in diamniotic twins' vaginal deliveryis indicated. The big problem is in the second twin, especially when it is not in head presentation, there are contradictory data from the literature, while some authors report that there are no advantages of caesarean section over vaginal delivery, other authors emphasize the risks of vaginal delivery such as increased perinatal morbidity, mortality and fetal distress.

Disadvantages of cesarean sections are increased maternal morbidity and increased cost of health benefits. In newborns weighing less than 600 gr, or in 26 weeks of gestation, vaginal delivery is recommended due to low survival rates [48–58].

Between 600 and 2000 g weight, or in 27–8 weeks of gestation, if the first fetus is not in head presentation, then a caesarean section is recommended to avoid umbilical cord prolapse and twin interlocking.

If the first fetus is in head presentation should made an effort for vaginal delivery. If the se fetus is not in head presentation at internal cephalic version should attempt immediately and in failure organization of an emergency cesarean section. In cases where the second twin is not in head presentation but has a weight of over 2000 g external cephalic version should attempt and in case of failure internal cephalic version should attempt under local anesthesia and in repeated failure emergency cesarean section should be done. In cases of weight difference from 500 g of the weights of the two fetuses cesarean section in monoamniotic twins should be performed. Cesarean section is a routine method for termination of labor to prevent umbilical cord prolapse and twin interlocking in IUGR, conjoined twins or twins with TTTS [55–58].

4.2 Main complications of vaginal twin delivery

Inter-anchoring of twins in a longitudinal lie can occur in either cephalic presentations or in breech presentations.

Acute twin-to-twin transfusion syndrome is rare and is associated with changes in intravascular pressure along large vascular anastomoses and intrauterine pressure during labor, creating a risk of heart failure and exchange transfusion between twins.

It is recommended in low-risk twin pregnancies of dichorionic twins a birth planning for 37th week and of monochorionic twins for 36th week.

In monochorionic monoamniotic pregnancies, caesarean section is preferred to avoid overlapping (1/1000 births). According to the Bibliography the number of cesarean sections required to prevent a neonatal death is between 264 and 1451.

The above reports are disadvantageous in terms of their validity because the data on how to arrange the birth of the 2nd fetus, the interval between the 1st and 2nd births as well as the type of obstetric manipulations are missing or insufficient. Therefore, the potential benefits to the newborn of a Caesarean section should be weighed against the potential short-term and long-term risks of complications from the mother.

According to recent data on short-term and long-term maternal morbidity, scheduled Caesarean section is not recommended in all low-risk twin pregnancies. In contrast, scheduling vaginal delivery in twin pregnancies >35 weeks with a head projection of the 1st fetus is a relatively safe and acceptable method, provided that staff are experienced in arranging the 2nd fetal delivery.

The way of terminating the labor in twin pregnancies is increasingly troubling the modern obstetrician due to the large number of twin pregnancies that result from the application of assisted reproduction methods. The frequency of stillbirths and perinatal morbidity and mortality are higher in twin pregnancies.

Retrospective studies have shown that caesarean section has the advantage of reducing the morbidity of the 2nd fetus [55–58].

Many meta-analyzes of studies comparing selective Cesarean section with vaginal delivery do not find an advantage in performing cesarean section. Due to the small number of the above studies, more and larger ones need to be carried out. Future research should also look at the possible causes of increased stillbirths in twin pregnancies as well as investigating the role of chorionicity in the normal or non-development of childbirth [55–58].

Due to the dramatic increase in the frequency of Caesarean sections observed in recent years and the increase in the frequency of twin pregnancies, and despite the

higher risk of perinatal asphyxia compared to single pregnancies, it is suggested by many studies near the probable date of delivery. According to most recent literature, it is recommended between 37^{+3} and 37^{+5} weeks of pregnancy [55–58].

Nowadays, there is an increase in the frequency of twin pregnancies after spontaneous conception in developed countries, which is explained by the choice to have children at an advanced age (approximately 6% compared to 2.3% 4 years ago). In addition, over the last decade there has been an increase in the incidence of twin pregnancies worldwide as a result of the increasing demand for assisted reproduction methods. Especially in Canada this increase amounted to 15% during 2007–2012.

Twin pregnancies are characterized by increased perinatal morbidity and mortality require larger amounts of surfactant after admission to the Neonatal Intensive Care Unit department especially in the early week and are accompanied by increased maternal morbidity and mortality attributed mainly to the increased risk of bleeding [44–58].

4.3 Increased mortality of full-term twins

According to bibliographic sources in twin pregnancies there is an increase in the relative risk of stillbirth and the risk of unpleasant events during childbirth is increased.

The neonatal mortality of twins compared to single pregnancies is 4.3‰ against 3.8‰ for newborns weighing 2501-3000gr, and 7.4‰ against 2.2‰ for newborns weighing 3000gr. Double mortality during childbirth is also reported.

Due to the evolution of perinatal neonatal care, there is a decrease in the risk of perinatal death of twins during the last three decades. Higher perinatal mortality was also observed in twin neonates with birth weight > 2500gr compared to corresponding weights of single pregnant neonates.

Referring to retrospective studies involving large numbers of twin births, selective caesarean section can also reduce perinatal mortality of full-term twins by 75%. Also important factors that influence the obstetrician to the choice of elective caesarean section are the often observed relatively high (> 35 years) age of the interest rates, as well as the fact that the majority are first-borns. In cases of premature births or severe retardation of intrauterine growth, most recommend caesarean section in pregnancies <32 weeks or when the weight of the fetus is <1500gr.

Regarding the method of conception, twin pregnancies after IVF, ICSI show a higher frequency of premature births, births of infants with residual weight as well as other events. The risk of stillbirth increases after the completion of the 37th week of pregnancy and is 6–9 times higher in dichorionic twins and even more in monochorionic. It is recommended to perform selective Caesarian section in the dichorionic twins in the 37th week and the 36th in the monochorionic twins [44–58].

4.4 Delivery termination time

The International Society for Twin Studies and SOGC recommend giving birth before the 38th week of pregnancy. It is considered a reasonable choice to design a selective low transverse cesarean section during the 38th week.

4.4.1 Absolute indications

Monoamniotic twins due to high risk of umbilical cord prolapse.
Siamese twins

When the presentation of the 1st is not cephalic.

When the 1st of the embryos is in breech presentation, it is recommended to perform a Caesarean section due to the insertion and impossibility of descent of the protruding parts through the pelvic tube, especially when the 2nd embryo is in cephalic presentation. Although the above development is very rare, it is accompanied by high perinatal mortality.

Even when the projection is head-shaped, vaginal delivery remains a controversial choice, due to the increased likelihood of obstetric complications, which usually occur after the birth of the first fetus (placental obstruction, umbilical cord prolapse, fetal bradycardia). Moreover, we should note that the maternal postoperative infections are more frequent, as it becomes necessary to perform an emergency cesarean section for the second fetus.

Empirically and traditionally, the attempt for vaginal delivery is made when the projection of the first fetus is head and there are no other complications, but this has not been proven by well-designed prospective studies. According to the same study, the main cause of neonatal death in relation to the projection of the birth of the second fetus is suffocation-acidosis of the fetus, while the above cause can also cause cerebral palsy.

Remarkably, in most of the younger Obstetricians there is a lack of sufficient capacity, training and experience to deal with success with the increased obstetric requirements of the second fetus, especially when the projection is not cephalic.

According to studies that openly state the choice of whether or not to perform a caesarean section when the projection of the 2nd was not cephalic, 84% of caesarean sections were confirmed with similar rates of neonatal morbidity and mortality between the 2 fetuses. The manner of termination of childbirth in twin pregnancies is increasingly problematic for the modern obstetrician due to the large number of twin pregnancies resulting from the application of assisted reproduction methods. The frequency of stillbirths and perinatal morbidity and mortality are higher in twin pregnancies.

Several studies have shown that vaginal delivery of the 2nd fetus is accompanied by increased perinatal morbidity and mortality and they consider it necessary to perform a selective Cesarean section. In all twin pregnancies, the 2nd fetus can be significantly protected.

Based on the above, it is proposed the vaginal arrangement of the birth of twins only in cases of interest rates: multipara women, aged <35 years, with cephalic presentation of both fetuses, in full-term, without pathology pregnancies, the duration of which does not exceed 38 weeks and which occurred after normal conception. In all other cases, the execution of Caesarian section is proposed [44–58].

5. Discussion

Twin pregnancies have had a steady 70% increase since 1980 and are associated with increased perinatal mortality about 4 times higher than single pregnancies. The main cause of morbidity is preterm birth with an average birth of 35 weeks, the following are: intrauterine growth restriction, intrauterine death, hydramnio (about 10% of cases), preeclampsia (triple incidence in congenital pregnancies), congenital abnormalities, iron deficiency anemia, postpartum hemorrhage, placental abruption and precursor placenta [40–50].

Multiple pregnancies are high-risk pregnancies and are associated with increased neonatal morbidity and mortality, mainly due to prematurity. To understand how a multiple pregnancy increases the rates of adverse neonatal outcomes, it is necessary to record for each incident:

a. the mode of conception (natural conception or assisted reproduction)

b. the possibility of fetal death (automatic initially or after meiosis)

c. the family history of multiple pregnancies

d. the descriptive anatomy of the placenta

The successful use of assisted reproduction techniques is a milestone in the treatment of infertility. The increase of multiple pregnancies is a very important issue, open for solution, since they are accompanied by numerous medical and social problems. Preventing multiple pregnancies with the prudent use of available techniques will contribute significantly to solving this problem [6, 16].

Premature birth before 32–33 weeks of gestation is a major cause of complications in multiple pregnancies. The average age of spontaneous delivery is about 35.5 weeks while in multiple pregnancies it is 33 weeks. Premature birth occurs in 20–50% of twin pregnancies, which means 7–10 times more often compared to single pregnancies. The increased likelihood of twins' complications is mainly due to the high incidence of low birth weight infants as a result of premature or intrauterine growth restriction.

Prematurity is directly responsible for the high neonatal morbidity and mortality of twin pregnancies, due to the high probability of respiratory distress syndrome, intra-abdominal bleeding and necrotic enterocolitis. Also, there are increased rates of residual development of one fetus, or both of them, congenital abnormalities and complications associated with the Twin to twin Transfusion Syndrome (TTTS). Twin pregnancies complicated by premature birth burden the family financially and psychologically, because it requires the transfer of the pregnant woman or the newborn to tertiary hospitals, which have special intensive care units [58–65]. The incidence of depression is increased in mothers of twins, which requires special attention from the clinical doctor.

Newborns born from twin and triplet pregnancies are accompanied by the long-term consequences of perinatal complications. Cerebral palsy is the most common complication of multiple pregnancies. The rates of cerebral palsy are five times higher among twins and ten times higher among triplets, compared with other newborns. The case described in our study with persistent paraplegia was due to fetal hypoxia, cerebral palsy due to placental abruption in the 26th week of pregnancy [58–65].

A particularly important issue is the delivery time of a twin pregnancy and the growing tendency for premature termination of multiple pregnancies, as the increased tendency for preterm delivery in multiple pregnancies and the performance of premature cesarean section have significantly contributed to the increase in neonatal in multiple pregnancies. However, it is noteworthy that the selective neonatal decreases fetal mortality. The explanation for this lies in the fact that the duration of multiple pregnancies after a period of time increases the likelihood of endometrial death. In triplets, in particular, it is reported that after 34 weeks, fetal mortality increases significantly and requires close obstetric monitoring [65–68].

On the other hand, the preventive administration of corticosteroids as a routine, now, in all centers to enhance the pulmonary maturity of the fetus and the use of the surfactant, immediately after birth in premature infants, have the effect of drastically reducing deaths from respiratory distress syndrome in neonates of multiple pregnancies. There is evidence to suggest that the estimate of fetal weight of multiple pregnancies, with the growth curves created for single pregnancies, is incorrect.

Recent data from population studies show that optimal survival of neonates from multiple pregnancies is observed at a younger gestational age and lower body weight than in neonates of single pregnancies [68–70].

The developmental curves of the embryos used in the daily obstetric practice and in our country, are the result of the analysis of data from hospital databases, in non-European populations. According to studies, the distribution of fetal weight in relation to gestational age varies significantly, depending on the population and the time period. There is a difference of up to 11% in the average birth weight of newborns of different populations, at a certain gestational age, while the differences are even greater, exceeding 45% for the third percentage growth curve of the populations of these newborns [68–74].

Residual intrauterine development of fetal twin pregnancies is traditionally diagnosed using single growth curves from single pregnancies. Twins grow at rates similar to those of single pregnancies by the 30th week, followed by slower growth rates, while the same applies to the way triplets develop in relation to twins. Therefore, the developmental curves of the newborns should be revised and adjusted according to the number of fetuses and the gestational age, in order to become more rational.

Systematic monitoring of multiple pregnancies and the correct guidance of the doctor to the pregnant woman for a conservative lifestyle, are the cornerstone for avoiding prematurity. Ultrasound plays an irreplaceable role in the monitoring of multiple pregnancies, with the timely determination of the number of fetuses, the chorionic villus sampling, the position of the placenta and the continuous assessment of the development of the fetus in terms of weight [65–74].

In addition, the use of Doppler contributes to the early diagnosis of intrauterine growth disorders and fetal distress. The use of ultrasound in combination with cardiotocography and the systemic administration of corticosteroids, in all multiple pregnancies between 27 and 33 weeks, are the modern arsenal of the Obstetrician for the diagnosis and treatment of prematurity in these pregnancies. Also, the measurement of fetal fibronectin in the cervix, the ultrasound determination of the length of the cervix or the measurement of estradiol in the saliva of the pregnant woman, are techniques that are experimentally applied for the early diagnosis of premature birth [65–74].

Regarding the method of childbirth in multiple premature pregnancies, both worldwide and in our country, there is a tendency to increase caesarean sections, which is statistically significantly associated with a reduction in intrauterine deaths, single pregnancies. This risk is only 1% in a single pregnancy, while it increases by 10% in dichorionic twins and 15% in monochorionic twins, due to the occurrence of complications from placental anastomoses [65–74]. Therefore, measuring the length of the cervix during the ultrasound examination in the first and second trimester helps to prevent and properly treat impending prematurity. Twin pregnancies are high-risk pregnancies. The average gestational age for twins is about 35 weeks. Newborns of multiple pregnancies have a low birth weight, with an average of 2,500 g for twins. About 10% of twins and 25% of triplets have a birth weight of less than 1,500 g. Low birth weight results in high perinatal mortality, especially in monochorionic pregnancies accompanied by an increased rate of prematurity [65–74].

Multiple pregnancies resulting from infertility are at increased risk of preterm birth versus twin pregnancies with normal conception. This is due to pre-existing risk factors in women with a history of infertility such as uterine abnormalities pelvic infections surgery. Assisted reproduction methods increase monozygotic twins 12 times 13% after ovulation induction 22% for triplets with monozygotic twins. It is estimated that in multiple pregnancies the increased infant mortality is accompanied by almost twice the probability of severe neonatal disability compared to single pregnancies [65–74].

According to an analysis of the International Bibliography, they were certified at a high frequency of complications from fetuses, but the assessment of the above data should be done with consideration and strict criteria according to the guidelines.

Many researchers have found that along with the increase of pregnant's women age, there is a corresponding increase in the frequency of multiple pregnancies. Other researchers have found an increased incidence of multiple pregnancies in high births compared to first-borns, although the widespread use of assisted reproduction methods now tends to reduce this increase [65–74]. The large increase in the frequency of caesarean sections (41%) is one of the most dramatic changes in the last 40 years regarding the manner of delivery. This large increase is attributed to the fear of possible legal involvement and to the increased perinatal morbidity and mortality of the second neonate, especially when the shape is not vertical. Perinatal mortality has decreased in recent years, hovering internationally at 9.6% without a statistically significant difference between newborn twins [65–74]. An important contribution to the formation of perinatal mortality has the birth of multiple newborns weighing less than 1500gr. According to many researchers, no significant difference was found in the Apgar score between 1st and 2nd twins, as well as a relationship between the score and the way the childbirth was completed. According to others in twins born with a normal birth, the Apgar score of the 1st minute of the 2nd was lower compared to that of the 1st. There has also been a recent increase in the Apgar score, especially in the second duo indicative of a better perinatal outcome.

An important role in reducing perinatal mortality and improving perinatal status was played by the early diagnosis of multiple pregnancies in the last 20 years, as well as the systematic application of ultrasound and Doppler ultrasound in their monitoring [65–74]. The above resulted in a more accurate estimate of the probable birth weight, shape and projection, as well as the more correct design of the delivery arrangement.

The frequency of premature births and births of newborns weighing less than 2500gr. remains high despite the systematic application of tocolytic preparations and the restriction of activity until complete multiple immobility of pregnant women.

Regarding the way of arranging births in multiple pregnancies, a particularly statistically significant increase in the frequency of caesarean sections was observed in the last 5 years, amounting to 97.1% for the same reasons as described by internationally renowned researchers [65–74]. Regarding the application of biophysical methods of monitoring prenatal control in twin pregnancies of our study we found increased frequency of cardiotocographic lesions in the form of predominantly varying decelerations especially in the 2nd twin fetus and the above finding can be explained by the relatively high frequency of false positive cardiotocographic findings observed internationally.

The Apgar rating of twin pregnancies, as well as between 1st and 2nd newborn twins, clearly showed that the perinatal condition, especially of the 2nd newborn, was slightly aggravated. This finding contradicts that of many researchers, although many agree with our results without a satisfactory interpretation, possibly due to the frequently changing abnormal projection of the latter. We did not find a statistically significant difference in gender [65–74]. The perinatal mortality of twin pregnancies in our study did not differ significantly from that of the international literature, which confirms the significant improvement in recent years in the application of modern and accurate methods of diagnosis, monitoring of pregnancy and childbirth.

6. Conclusions

In conclusion, in terms of the frequency of multiple pregnancies, perinatal mortality in our region did not differ significantly from that of other advanced countries in Western Europe and North America.

Increased vigilance and care is required in the arrangement of childbirth and the resuscitation of the second newborn because we found that his perinatal condition is significantly lower than that of the first. Significant effort should be made to extend the time of twin pregnancies which would effectively help reduce the frequency of preterm births and caesarean sections.

Although twins appear to be at higher risk for perinatal neonatal outcomes than single pregnancies, they are better when they are born at a mature gestational week and close to the expected due date. To date, however, the optimal delivery time of the duo although still controversial, based on current results, is 37^{+3} weeks of gestation. Regarding the manner and time of termination of labor beyond 35 weeks of gestation is determined according to the literature by many factors gestational age of the two fetuses estimated weight projection twins experience of the obstetrician.

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