Annals of Biomedical and Clinical Research

Original article

ABCR Vol 2; No 2; 2023;84-89

Multiple pregnancies over a five-year period: complications in pregnancy, mode of delivery and perinatal outcome

Ivana Bevanda[1], Vedran Bjelanović[2], Tatjana Barišić[2], Marjana Jerković-Raguž[3], Ana Čuljak[4], Ivona Šušak[2]

[1]Department of Endocrinology and Diabetology, [2]Department of Gynecology and Obstetrics, [3]Department of Pediatrics, [4]Department of Rheumatology University Clinical Hospital Mostar and University of Mostar School of Medicine, Mostar, Bosnia and Herzegovina

ABSTRACT

Background: The aim of this study was to determine the type and frequency of complications during multiple pregnancies, mode of delivery and perinatal outcomes in three groups of pregnant women, categorized by gestational age of pregnancy.

Methods: A total of 149 pregnant women and their neonates were included and divided into three groups according to gestational age: moderately preterm birth (from 22 to 33 + 6 weeks - MPTB), late preterm birth (from 34 to 36 + 6 weeks - LPTB) and term birth (from 37 weeks). SPSS for Windows software (version 23.0, SPSS Inc., Chicago, Illinois, USA) was used for statistical analysis.

Main findings: Of the total 149 pregnancies, 64.86% were completed by Cesarian section, which was the dominant mode of delivery in all gestational groups. Hypertension, preterm premature rupture of membranes (PPROM) and gestational diabetes pregnancy were the most common complications in the term birth group, PPROM and preeclampsia in the LPTB group, and multiple maternal complications in the MPTB group ($p < 0.001$). In both twins, respiratory distress syndrome (RDS) was the most common complication in the MPTB group, and neonatal jaundice and perinatal infection and sepsis in the LPTB and term birth groups.

Principal conclusions: Cesarian section was dominant mode of delivery in all groups. RDS and multiple complications were significantly more common in the MPTP group, and neonatal jaundice, perinatal infections and sepsis in the LPTP and term birth groups.

Key words: multiple pregnancy, PPROM, preeclampsia, hypertension, perinatal complications, Cesarian section

Article processing history:
Received September 1, 2023
Revised September 20, 2023
Accepted October 15, 2023

ORCID IDs of the authors:
I.B. 0000-0003-1186-2020
V.B. 0000-0002-4493-9963
T.B. 0000-0001-5806-833X
M.J.R. 0000-0002-1158-7965
A.Č. 0000-0002-9481-5918
I.Š. 0000-0001-6204-8454

Corresponding author:
Ivana Bevanda
E–mail:
bjelanovic.ivanaaa@yahoo.com,

Cite this article as: Bevanda I, Bjelanović V, Barišić T, Jerković Raguž M, Čuljak A, Šušak I. Multiple pregnancies over a five-year period; complications in pregnancy, mode of delivery and perinatal outcome. Annals of Biomedical and Clinical Research. 2023;2:84-89.

https://doi.org/10.47960/2744-2470.2023.2.2.84

INTRODUCTION

Multiple pregnancies are becoming a public health problem because of their significantly higher rates of adverse neonatal and perinatal outcomes (1). The most significant complication of multiple pregnancies is premature birth, which accounts for 50% of all complications. Determination of IGFBP-1 levels may predict later preterm premature rupture of membranes (PPROM) (2, 3). Premature birth is associated with low birth weight and poorer perinatal outcomes. Twin pregnancies are also complicated by hypertension, preeclampsia and eclampsia, intrahepatic cholestasis and gestational diabetes mellitus, thromboembolic incidents, polyhydramnios and kidney disease (4-7). Increased BMI in pregnant women carries a very high risk of developing preeclampsia in twin pregnancies. All of these complications are significantly more common in multiple than in singleton pregnancies. Approximately one in every 250 cases of monochorionic twins acquires twin transfusion syndrome (discordant growth) (8).

The birth of multiple pregnancies often ends with Cesarean section because of the accompanying complications that include irregular labor, placental abruption, umbilical cord prolapse, bleeding due to atony and postpartum hemorrhage (9). As premature birth is common, the incidence of perinatal asphyxia, respiratory distress syndrome (RDS), perinatal infection and sepsis, intrauterine growth restriction, intracranial hemorrhage and metabolic disorders are all increased (10-14). All of these complications are more common in monochorionic and monoamniotic pregnancies (15). However, there has been a lack of comparison of these complications in different gestational groups.

The aim of the present study was to determine the type and frequency of complications during multiple pregnancies, mode of delivery and perinatal outcomes in in three groups of pregnant women, categorized by gestational age of pregnancy.

MATERIALS AND METHODS

Participants

The study included 149 women with multiple pregnancies who were hospitalized and delivered at the Clinic for Gynecology and Obstetrics of the University Clinical Hospital Mostar, in the period from 2015 to 2019. The women were divided into three groups according to gestational age and hospitalization: moderately preterm birth (22 to 33 + 6 weeks - MPTB), late preterm birth (34 to 36 + 6 weeks - LPTB) and term birth (37 weeks to delivery). The study also included newborns from multiple pregnancies hospitalized at the Clinic for Gynecology and Obstetrics and the Clinic for Pediatrics, University Clinical Hospital Mostar.

Methods

Data were collected from medical records of the Clinic of Gynecology and Obstetrics and the Department of Neonatology and Intensive Care of newborns, Pediatric Clinic Hospital of the University Clinical Hospital Mostar. The history of disease, release letters and protocols of patients and newborns were taken during the specific time period. Excluded participants were pregnant women with severe chronic diseases, premature infants with chromosomal abnormalities that cause mortality and fetuses that died during pregnancy (i.e., in utero). Maternal complications during pregnancy, delivery mode and perinatal complications in newborns were discussed.

Statistical analysis

The statistical parameters were processed and analyzed via Microsoft Excel (version 10, Microsoft Corporation, Redmond, WA, USA) and SPSS for Windows (version 23.0, SPSS Inc., Chicago, Illinois, USA). Differences in categorical variables were tested by the Chi-square test and Fisher's exact test where necessary. Differences between continuous variables were tested by Student's t-test. The

probability level of p <0.05 was taken as statistically significant.

RESULTS

This five-year study included 149 twin pregnancies. The mean age of pregnant women with multiple pregnancies was 31.94 ± 5.349 years and the mean weight gain was 15.40 ± 5.349.

Cesarian section was the dominant mode of delivery, occurring in 64.86% of the 149 multiple pregnancies. The highest percentage was in the group of 34-36 weeks, with statistically significant differences in the group of primiparous women (p <0.001) (Figure 1).

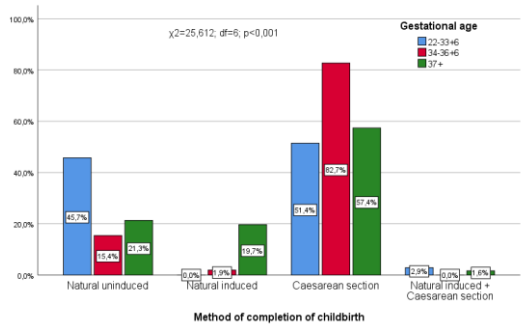

Figure 1. Differences in mode of delivery in relation to gestational age of multiple pregnancies

Hypertension, PPROM and gestational diabetes were the most common complications in the term birth group, PPROM and preeclampsia in the LPTB group and premature birth and multiple maternal complications in the MPTB group; the differences were statistically significant (p <0.001) (Figure 2).

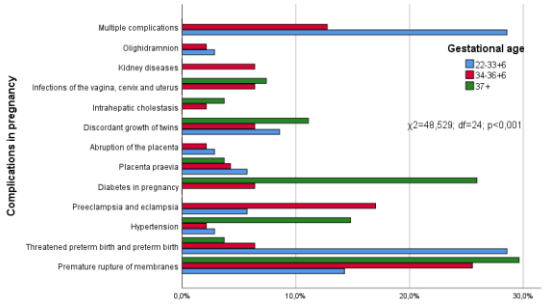

Figure 2. Differences in incidence of complications in pregnancy in relation to gestational age

Of the total number of newborns in the examined sample, 154 were transferred to the Department of Neonatology and Intensive Care, of which 49.66% were both twins from twin pregnancies; the differences were statistically significant (p <0.001) (Figure 3).

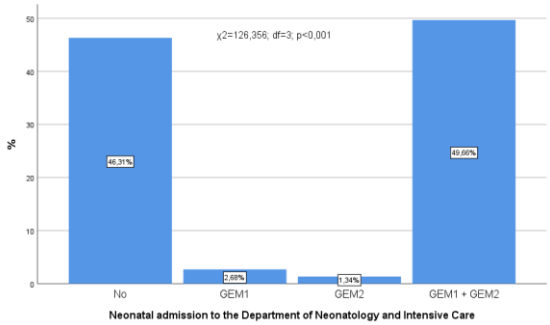

Figure 3. Neonatal admission to the Department of Neonatology and Intensive Care of the University Clinical Hospital Mostar

RDS was the most common complication in the group of 22-33 + 6 weeks (37.5%) and neonatal jaundice and perinatal asphyxia in the groups of 34-36 + 6 weeks and 37 weeks to delivery. Multiple complications were significantly more frequent in the group of 22-33 + 6 weeks in the first (25%) and second twin (31.3%) compared to the other groups. In the term birth group, there were no multiple complications. The observed differences were statistically significant (p<0.001) (Table 1).

Table 1. Differences in perinatal complications of multiple pregnancies in relation to gestational age

	Gestational age						χ^2	p
	22 - 33+6		34 - 36+6		37+			
	n	%	n	%	n	%		
Perinatal complications GEM1								
Intrauterine growth restriction	2	6.3	2	6.5	2	9.1	46.744	<0.001*
Neonatal jaundice	2	6.3	16	51.6	13	59.1		
Respiratory distress syndrome	12	37.5	1	3.2	0	0.0		
Perinatal asphyxia	1	3.1	0	0.0	1	4.5		
Perinatal infection and sepsis	2	6.3	4	12.9	5	22.7		
Intracranial hemorrhage	1	3.1	1	3.2	0	0.0		
Apnea	1	3.1	0	0.0	0	0.0		
Anemia in premature infants	2	6.3	1	3.2	1	4.5		
Metabolic disorders	1	3.1	3	9.7	0	0.0		
Multiple complications	8	25.0	3	9.7	0	0.0		
Perinatal complications GEM2							59.344	<0.001*
Intrauterine growth restriction	1	3.1	1	2.8	1	4.5		
Neonatal jaundice	0	0.0	16	44.4	13	59.1		
Respiratory distress syndrome	11	34.4	1	2.8	0	0.0		
Perinatal asphyxia	3	9.4	1	2.8	0	0.0		
Perinatal infection and sepsis	3	9.4	5	13.9	7	31.8		
Intracranial hemorrhage	1	3.1	3	8.3	0	0.0		
Apnea	0	0.0	0	0.0	1	4.5		
Anemia in premature infants	2	6.3	2	5.6	0	0.0		
Metabolic disorders	1	3.1	3	8.3	0	0.0		
Multiple complications	10	31.3	4	11.1	0	0.0		

* Fisher's exact test

DISCUSSION

The dominant method of delivery among the study sample was Caesarean section (64.86 % of pregnancies). A quarter of all twins were born naturally and few via induced labor. Caesarean section was the main mode of delivery regardless of gestational age and parity, but most common in primiparous women. PPROM, gestational diabetes and hypertension were the most common complications in the gestational age group from 37 weeks to delivery, PPROM and preeclampsia in the group of 34-36 + 6 and premature birth and multiple complications in the group of 22-36 + 6 weeks.

Some 154 neonates were transferred to the Department of Neonatology and Intensive Care of Clinic for Pediatrics University Clinical Hospital Mostar, and only 6.04% of them died. The low mortality rate is due to the exclusion of fetuses that died during pregnancy (i.e., in utero) and of stillbirths. In both twins, RDS was the most common complication in the MPTB group (37.5% and 34.3%) and neonatal jaundice, perinatal infection and sepsis in the LPTB and term birth groups. Multiple complications (two or more perinatal complications included in the study) were significantly more common in the MPTB group in the first and second twin compared to the other groups.

Other studies have shown an increase in the frequency of Cesarian sections in multiple pregnancies, but the medical justification for this mode of delivery is unclear. According to a 27-year retrospective study from Finland, 44.9% of twins were born prematurely, 47.1% were delivered by Cesarian section and 27.7% were induced (10). In the United States, the percentage of completion of a twin pregnancy by Cesarian section in 2013 was as high as 74.8% (17). The reasons for such different outcomes are likely due to differences in

prenatal care and follow-up of pregnant women, more frequent complications in pregnancy and preferences and decisions of obstetricians on how to complete childbirth. The National Institute of Child Health and Human Development conducted a similar study of maternal complications in three groups by gestational age, finding that preeclampsia and PPROM were also the most common complications in the 34-36 + 6 week gestational group (19). Secondary analysis of a World Health Organization Multi-Country Survey (WHOMCS) conducted in 29 countries found a similar result in which 52.9% of newborns were transferred to neonatal intensive care units (19).

We compared the results of perinatal complications with the previously mentioned NICHD study, but this did not include neonates with a gestational age below 30 weeks in the MPTB group. The incidence of RDS in the first group was 28.8%, which is similar to the present study. In LPTB and term birth groups, there were slightly different complications, the percentages of perinatal infection and sepsis were lower and the incidence of RDS was significantly higher. The lower incidence of RDS in the LPTB group in our study can be attributed to antenatal care of pregnant women and the administration of corticosteroid therapy. The NICHD study did not include neonatal jaundice or other complications (18).

The advantage of the present study is the presentation and comparison of perinatal complications across three gestational groups of neonates. The main limitation is the small sample of multiple pregnancies. Proper antenatal care in tertiary care centers can significantly improve outcomes for both mother and child.

CONCLUSION

Women with multiple pregnancies and lower gestational age had more frequent and multiple complications in pregnancy. The dominant mode of delivery was Cesarian section in all gestational groups. RDS and multiple complications were significantly more common in the MPTB group and neonatal jaundice, perinatal infections and sepsis in the LPTB and term birth groups.

ACKNOWLEDGMENTS
None

FUNDING
The author(s) received no financial support for the research, authorship and/or publication for this study.

CONFLICT OF INTEREST
The authors declares that they have no conflict of interest.

AUTHORS' CONTRIBUTIONS
I.B: and V.B. conceived and designed the study; I.B, V.B., T.B., M.J.R., A.C. and I.S. collected the data; I.B and V.B. analyzed the data; I.B, V.B., T.B., M.J.R., A.C. interpreted the results; I.B. and T.B. prepared the figures; I.B. drafted the manuscript; I.B, V.B., T.B., M.J.R., A.C and I.S edited and revised the manuscript; I.B, V.B., T.B., M.J.R, A.C. and I.S. approved the final version of the manuscript.

ETHICAL BACKGROUND

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the University Clinical Hospital Mostar (Mostar, July 7th 2020.).

Informed consent statement: Informed consent was obtained from all subjects involved in the study.

Data availability statement: We deny any restrictions on the availability of data, materials and associated protocols. Derived data supporting the findings of this study are available from the corresponding author on request.

REFERENCES

1. Cunningham FG, Leveno K, Bloom S, Spong C, Dashe J, Hoffman B (eds.) Williams Obstetrics 25th Edition. McGraw-Hill Medical; 2018. p. 1336-1342.
2. Fuchs F, Senat MV. Multiple gestations and preterm birth. Semin Fetal Neonatal Med. 2016;21:113-20.
3. Sisti G, Paccosi S, Parenti A, Seravalli V, Di Tommaso M, Witkin SS. Insulin-like Growth Factor Binding protein-1 Predicts Preterm Premature Rupture of Membranes in Twin Pregnancies. Arch Gynecol Obstet. 2019;300:583-587.
4. Hayes- Ryan D, Meaney S, Hodnett A, Geisler M, O'Donoghue K. The maternal and perinatal implications of hypertensive disorders of pregnancy in a multiple pregnancy cohort. Acta Obstet Gynecol Sand. 2019;23.
5. Laine K, Murzakanova G, Sole KB, Pay AD, Heradstveit S, Räisänen S. Prevalence and risk of pre-eclampsia and gestational hypertension in twin pregnancies: a population-based register study. BMJ Open. 2019;4:9.

6. Wu D, Huang L, He Z, Huang X, Fang Q, Luo Y. Preeclampsia in Twin Pregnancies: Association With Selective Intrauterine Growth Restriction. J Matern Fetal Neonatal Med. 2016;29:1967-71.
7. Hiersch L, Berger H, Okby R, Ray JG, Geary M, McDonald SD, et al. Gestational Diabetes Mellitus Is Associated With Adverse Outcomes in Twin Pregnancies. Am J Obstet Gynecol. 2019;220:102.
8. Bamberg C, Hecher K. Update on Twin-To-Twin Transfusion Syndrome. Best Pract Res Clin Obstet Gynaecol. 2019;58:55-65.
9. Melka S, Miller J, Fox NS. Labor and Delivery of Twin Pregnancies. Obstet Gynecol Clin North Am. 2017;44:645-654.
10. Rissanen AS, Jernman RM, Gissler M, Nupponen I, Nuutila ME. Maternal complications in twin pregnancies in Finland during 1987-2014: a retrospective study. BMC Pregnancy Childbirth. 2019;19:337.
11. Van Steenis A, Kromhout HE, Steggerda SJ, Sueters M, Rijken M, Oepkes D, Lopriore E. Perinatal asphyxia in monochorionic versus dichorionic twins: incidence, risk factors and outcome. Fetal Diagn Ther. 2014;35:87-91.
12. Wieczorek AI, Krasomski G. Twin Pregnancy as the Risk Factor for Neonatal Intraventricular Hemorrhage. Ginekol Pol. 2015;86:137-42.
13. Hacking D, Watkins A, Fraser S, Wolfe R, Nolan T. Respiratory distress syndrome and birth order in premature twins. Arch Dis Child Fetal Neonatal Ed. 2001; 84:117–121.
14. Gupta P, Faridi MM, Goel N, Zaidi ZH. Reappraisal of Twinning: Epidemiology and Outcome in the Early Neonatal Period. Singapore Med. 2014;55:310-7.
15. Feng B, Zhai J, Cai Y. Effect of twin pregnancy chorionic properties on maternal and fetal outcomes. Taiwan J Obstet Gynecol. 2018;57:351-4.
16. Oldenburg A, Rode L, Bødker B, Ersbak V, Holmskov A, Jørgensen FS, et al. Influence of Chorionicity on Perinatal Outcome in a Large Cohort of Danish Twin Pregnancies. Ultrasound Obstet Gynecol. 2012;39:69-74.
17. Refuerzo JS, Momirova V, Peaceman AM, Sciscione A, Rouse DJ, Caritis SN, et al. Neonatal Outcomes in Twin Pregnancies Delivered Moderately Preterm, Late Preterm, and Term. Am J Perinatol. 2010;27:537-42.
18. Santana DS, Silveira C, Costa ML, Souza RT, Surita FG, Souza JP. Perinatal Outcomes in Twin Pregnancies Complicated by Maternal Morbidity: Evidence From the WHO Multicountry Survey on Maternal and Newborn Health. BMC Pregnancy Childbirth. 2018;18:449.