

Maternal cardiovascular disease and pregnancy: a 20-year experience

Scarrone M, Ossola MW, Zaina B, Duiella S, Gherbesi E, Colli A, Bonanomi C, Ferrazzi E
Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Università degli Studi di Milano, Milan, Italy

Objective

In recent decades, advances in cardiology and cardiac surgery have led an increasing number of women suffering from congenital or acquired heart disease to reach childbearing age and to approach pregnancy. In patients with heart disease, pregnancy increases the risk of deterioration of the maternal hemodynamic state and of fetal complications often due to the need to anticipate delivery. The primary objective of this study was to evaluate the incidence of maternal cardiac complications, obstetric complications, and neonatal outcomes in pregnancies complicated by maternal heart disease over two different decades (2001-2010 and 2011-2020). Maternal and fetal outcomes were compared by stratifying each of the two populations according to the subtype of heart disease (congenital, arrhythmic, valvular and cardiomyopathy).

Methods

We performed a monocentric retrospective observational study. We included in the study all pregnant patients with congenital or acquired maternal heart disease, who delivered at the Department of Obstetrics and Gynecology of Ospedale Maggiore Policlinico in Milan between January 1st, 2001 and December 31st, 2020. Clinical and obstetric data were collected retrospectively by consulting medical records and delivery room registers. P-values < 0.05 were considered statistically significant. Statistical analyses were conducted using SPSS version 13.0 software.

Results

From January 2001 to December 2020 a total of 512 pregnant women with heart disease were included in our analysis. Despite a comparable mean maternal age between the two decades (34.44 ± 4.88 vs. 34.32 ± 5.75), in the second decade we observed an increase in the age group over 45 years (2.6% vs. 0%, $p = 0.0238$). Comparing the type of cardiac disease, it emerged that in the second decade there was a statistically significant reduction in pregnant women with congenital heart disease (35.2% vs. 52.8%; $p = 0.0001$) and an increase in pregnant women with arrhythmias (27.6% vs. 14.9%; $p = 0.001$). In the second decade we also observed an increase in high-risk classes mWHO III (22% vs. 12.9%; $p = 0.01$) and mWHO IV (9.2% vs. 2.9%; $p = 0.008$) and reduction in the number of pregnant women with mWHO risk class II (40.1% vs. 51.9%; $p = 0.01$). As expected by the increased maternal age and higher risk classes, in the second decade we observed a higher incidence of cardiological complications (31.25% vs. 21.15%; $p = 0.015$) and obstetric complications (17.76% vs. 5.77%; $p = 0.0001$). From a multivariate analysis it emerged that risk factors associated with an increased risk of developing obstetric complications in pregnancy were maternal age (OR 1.06 95CI 1.006-1.118 $p = 0.03$), heart disease in WHO risk class III (OR 2.54 95CI 1.27-5.09 $p = 0.008$) or WHO IV (OR 3.27 95CI 1.16-9.22 $p = 0.025$). Regarding mode of delivery, we observed a significant increase in cesarean sections with cardiological indications in the second decade (24.34% vs. 16.83%; $p = 0.053$), particularly in the group of pregnant women with cardiomyopathy (48.7% vs. 18.2%; $p = 0.0035$). With respect to neonatal outcomes, in the second decade there was a slight reduction in the gestational age at delivery (36.98 vs. 37.65; $p = 0.002$) and in neonatal birth weight percentiles (36.7° vs. 47.52°; $p < 0.0001$) with respect to the first decade. In both decades the group of pregnant women with valvular disease had a statistically significant lower gestational age at delivery and women with cardiomyopathies had a statistically significant lower neonatal birth weight percentile. We did not find an increase in neonatal complications, despite the increased severity of cardiac disease and the decreased gestational age at delivery in the second decade.

Conclusion

Once pregnant women exposed to a greater cardiac risk have been identified, it should be considered that they have a greater probability of requiring a cesarean section on cardiological indications, associated with a greater risk of carrying out the delivery in an early gestational age, to prevent a deterioration of the hemodynamic state or to counteract the onset of serious complications. From the experience of our Center, it has emerged that in these twenty years the age and mWHO risk class of pregnant women with heart disease have increased. From our analysis it emerged that in both decades pregnant women with congenital heart disease developed fewer cardiological complications with respect to the other groups. The comparison between the two decades showed that cardiological and obstetric complications increased in the second decade, particularly in women with cardiomyopathy, in accordance with the highest mWHO risk class found. Nevertheless, neonatal outcomes did not worsen, demonstrating the advantages of close monitoring and multidisciplinary management of these pregnancies.