Tab. 3. *Obstetric outcomes of pregnancies*

	Group 1 (n = 19)	Group 2 (n = 33*)	p
Length of hospitalization (days; median ± IQR)	13.0 ± 14.0	5.0 ± 2.3	< 0.001
Birth per Caesarean section	19 (100%)	21 (63.6%)	< 0.01
Completed week of pregnancy	35.7 ± 3.1	38.5 ± 1.3	< 0.0001
Estimated blood loss (ml)	572 ± 156	474 ± 111	< 0.05
Oligohydramnion	1 (5.3%)	1 (3.0%)	NS
Preeclampsia	1 (5.3%)	0 (0%)	NS

*IQR – interquartile range, NS – not significant, * – calculation in Group 2 from the number of 31 pregnancies (two pregnancies that terminated in abortions were excluded from the evaluation)*

Tab. 4. *Neonatal outcomes of live-born newborns*

	Group 1 (n = 20)	Group 2 (n = 34)	p
Neonatal mortality	0 (0%)	0 (0%)	NS
Birth weight (g)	2442 ± 753	3285 ± 457	< 0.00001
Newborn length (cm)	45.8 ± 4.6	49.8 ± 1.5	< 0.0001
Apgar score (one-minute)	7.3 ± 2.1	9.1 ± 1.0	< 0.001
Apgar score (five-minutes)	8.6 ± 1.4	9.7 ± 0.6	< 0.001
Preterm delivery	9 (45.0%)	2 (5.9%)	< 0.01
Low birth weight	10 (50.0%)	1 (2.9%)	< 0.001
Mature newborn	10 (50.0%)	32 (94.1%)	< 0.01

NS – not significant

Tab. 5. *Maternal outcomes of pregnancies*

	Group 1 (n = 19)	Group 2 (n = 35)	p
Maternal mortality	1 (5.3%)	0 (0%)	NS
Heart failure	4 (21.1%)	1 (2.9%)	< 0.05
Supraventricular tachycardia	0 (0%)	1 (2.9%)	NS
Ventricular tachycardia	1 (5.3%)	1 (2.9%)	NS

NS – not significant

a significantly higher prevalence of newborns with low birth weight and, conversely, a significantly lower prevalence of mature newborns. These mothers had a significantly higher risk of preterm delivery. In group 1, nine out of 19 newborns were premature, of which three were very premature (gestational weeks 28-31) and six moderately premature (gestational weeks 32-36). In group 2, there were two moderately premature births out of 34 live-born fetuses. Not a single newborn in this group was very premature. No neonatal mortality occurred in either group. In group 2, the frequency of abortions was insignificantly higher than in group 1 (5.6% vs 0% of fetuses).

We found no significant differences between groups regarding maternal outcomes except for increased prevalence of heart failure in group 1 (Table 5). Among all pregnant women, one patient died (mWHO IV), which corresponded to maternal mortality of 1.9% of all pregnancies. This was a 31-year-old primigravida with severe pulmonary arterial hypertension (PAH), which was diagnosed in the 35th week of pregnancy. None of the pregnant women had a thrombotic event, aortic dissection during pregnancy or up to discharge, or postpartum haemorrhage.

Odds ratios (OR) of selected obstetric and neonatal outcomes of pregnancies are given in Figure 1.

Discussion

Obstetric and offspring risks are increased in women with heart disease. The magnitude of them is related to maternal cardiac risk (2). In the current study group, we found significantly worse obstetric and neonatal outcomes in mWHO III-IV classes compared to mWHO < III classes. The most robust data on pregnancy outcomes in women with heart diseases is provided by the ROPAC registry (3). In the years 2007-2018, 5739 pregnancies were prospectively included in 138 centers in 53 countries. Congenital heart diseases (57%) and valvular diseases (29%) dominated. Maternal mortality was 0.6%, while the highest was in PAH – 9% (3). This corresponds to our experience when the only maternal death was in a pregnant woman with PAH (maternal mortality 1,9%).

Obstetric complications were very common in the ROPAC registry – 17% (3). It also corresponds to our results, especially in mWHO classes III-IV. All our patients in these classes had an operative delivery and, compared to lower-risk patients in mWHO classes < III, they had a significantly shorter duration of pregnancy, longer hospitalization, and greater blood loss.

Special attention should be paid to the termination of pregnancy per C.s. According to the ESC, the indications are limited – dilatation of the ascending aorta > 45 mm, severe aortic stenosis, severe pulmonary hypertension (including Eisenmenger syndrome), severe heart failure, and prenatal treatment with oral anticoagulants (recommendation class IIa, level of evidence C) (1). In the ROPAC registry, the pregnancy was terminated per C.s. in 44% of pregnancies (3). In our cohort, deliveries per C.s. were more often and over-indicated, compared to ESC guidelines and the ROPAC registry. The prevalence of deliveries per C.s. was 100% in mWHO classes III-IV, 64% in mWHO classes < III, and 77% in our total cohort. Indication criteria for the delivery per C.s. were met according to the ESC guidelines in the given groups only in 79%, 0% (!), or 29% of