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ASSOCIATION BETWEEN SPECIFIC CHROMOSOME ABNORMALITIES AND GESTATIONAL AGE AND STAGE OF SPONTANEOUS ABORTIONS

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OBJECTIVE:

While studies have identified common chromosomal errors in spontaneous abortions (SABs), it has not been determined whether there is an association between specific chromosomal abnormalities and duration and stage of pregnancy. Therefore, this study aimed to determine whether certain chromosomal abnormalities are associated with gestational age and stage at which SABs occur.

MATERIALS AND METHODS:

This single center, retrospective study included first-trimester SABs with cytogenetics report of an abnormal karyotype from 2002-2022. All patients that underwent an intrauterine insemination (IUI) or transfer with an unscreened embryo, and well dated based on IUI or transfer date and by first trimester ultrasound, were included in the study. Patients were stratified into four groups by furthest stage of development prior to the SAB: gestational sac (GS), yolk sac (YS), fetal pole (FP), and fetal heartbeat (FHB). Patients were also divided by gestational age in weeks at the time of SAB. Our primary outcome was chromosomal abnormalities by stage of development. Secondary outcomes included chromosomal abnormalities by gestational age. Comparative statistics were performed using chi-square and Kruskal-Wallis.

RESULTS:

A total of 161 SABs were included in the analysis; of these, 133 had trisomies (83%), 5 triploidies (3%), 10 tetraploidies (6%), and 13 monosomies (8%). Trisomies involving chromosomes 15, 16, and 22 were more prevalent in advanced weeks of gestation, while those involving chromosomes 10 and 11 were increased in early pregnancies. Most SABs with chromosomal abnormalities were observed after FHB was identified (73.3%) with the highest incidence at weeks 7 and 8 of gestation (71%). Most of the trisomic losses occurred after FHB (77.4%), and



21.8% reached 9 to 11 weeks of gestation. All losses with triploidy occurred after FHB, with 40% reaching 9 to 11 weeks of gestation. All cases with monosomy progressed until weeks 7 to 11 of gestation. No embryos with tetraploidy progressed to the FHB stage or surpassed 8 weeks of gestation. (Table 1).

Table 1

Rate of chromosomal abnormalities by stage of development and gestational age

	GS (2.5%)	YS (8.7%)	FP (15.5%)	FHB (73.3%)	Weeks 5-6 (7%)	Weeks 7-8 (71%)	Weeks 9-11 (22%)
Trisomies (83%)	4	7	19	103	9	95	29
Monosomies (8%)	0	2	1	10	0	9	4
Triploidy (3%)	0	0	0	5	1	2	2
Tetraploidy (6%)	0	5	5	0	1	9	0
p-value	p<.0001	p=0.03	p=0.002	p<.0002	p<.0001	p<.00001	p<.0001

CONCLUSIONS:

There is an association between the type of chromosomal abnormality and gestational stage of development. While many embryos with trisomy or triploidy go on to develop a FHB, none of the tetraploid embryos reached fetal heart stage.

IMPACT STATEMENT:

Specificity in chromosomal abnormalities associates with the stage and age of pregnancy development.

REFERENCES:

N/A