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Clinical application of PGT-M for HLA-typing in Latin America.

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OBJETIVE

Preimplantation genetic testing for a monogenic disease (PGT-M) for Human Leukocyte Antigen (HLA)-typing enables the selection of healthy and HLA-compatible embryos with affected siblings. This approach supports life-saving procedures like hematopoietic stem cell transplantation, offering a unique therapeutic option. When PGT-M is performed only for HLA-typing: 25% of probability for an embryo HLA-matched. When PGT-M for HLA-typing is combined with the exclusion of monogenic diseases, the genetic chance of an HLA-matched and healthy embryo drops: 18,8% for autosomal recessive o x-linked disease and 12,5% for autosomal dominant (*Kakourou et al., 2018).*

This study aimed to review all HLA-typing cases from Latin America, focusing on the clinical success concerning the number of embryos available for transfer.

METHODS

This retrospective study included PGT-M/HLA-typing cases performed in Latin America between the years 2017 and 2024, that were referred to the same genetic laboratory. PGT-M was performed only for HLA-typing or combined with the exclusion of a monogenic diseases. HLA haplotyping was performed with an indirect approach (by STR markers). PGT for chromosomal abnormalities (PGT-A) was also added.

RESULTS

A total of 1150 PGT-M cases were performed in Latin America. From Brazil: 66 PGT-M for HLA-typing cases from a total of 815 PGT-M cases (8,1%). From Argentina: 2 from 129 PGT-M cases (1,6%). Interestingly, no cases for HLA-typing were registered from the rest of the countries of this region.

Considering the cases from Brazil and Argentina, a total of 44 couples performed 68 PGT-M/HLA-typing cycles with PGT-A (469 blastocysts). For only HLA-typing procedures there were only 6 PGT-M cycles, mainly for Leukemia. Regarding HLA-typing cases with the exclusion of monogenic diseases, cases were performed mainly for autosomal recessive diseases (94% for HBB gene).

	HLA only	HLA with monogenic disorder	Autosomal dominant	Autosomal recessive	X-linked disorder
Number of embryos analyzed	35	434	1	388	45
HLA-matched	22.9% (8/35)	25.8% (112/434)	1	100	11
Unaffected for the disease	-	17.2% (75/434)	100% (1/1)	16.8% (65/388)	20% (9/45)
Affected for the disease	-	37	-	35	2
Non-HLA matched embryos	26	304	-	273	31
Unaffected for the disease	-	200	-	178	22
Affected for the disease	-	104	-	95	9
Incomplete/inconclusive diagnosis	1	18	-	15	3
TRANSFERABLE EMBRYOS (HLA-matched (unaffected) and euploid)	8.6% (3/35)	11.5% (50/434)	1	10.8% (42/388)	15.5% (7/45)
Maternal age	37.4 ± 2.5	34.6 ± 5,0	26	35.2 ± 4,8	32.5 ± 5,0

Table 1: Results about the number of HLA-matched embryos and embryos available for transfer.

Overall, the mean of embryos analyzed per couple was 10.6, and 53 embryos (11,3%) were available for transfer: **30 couples (68,2%) had at least one embryo for transfer, and 14 couples (31,8%) did not achieve an embryo transfer, and gave up treatment or assisted reproduction.**

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CONCLUSIONS

PGT-M could be valuable for achieving an HLA-matched pregnancy with an affected offspring. More than half of the couples had an embryo for transfer. The first PGT-M case for HLA-typing was reported in 2001 (Verlinsky et al., 2021). However, apart from Brazil, its use remains limited in Latin America, possibly due to a lack of awareness about its availability, high costs of IVF treatments and genetic tests, the need for many embryos to ensure a suitable match, and the ethical issues concerning the embryo selection.