Stem Cell Treatment (SCT) & Autism

SEECA

Panel discussion:
Cord Blood – Stanislav Volchkov, MD, PhD, Samara, Russia
Bone Marrow – Dusan Maric, MD, PhD and Dzihan Abazovic, MD, Serbia
Cord Tissue / MSCs – Magdalena Chrościńska-Krawczyk, MD, PhD, Poland

The procedure

The ongoing clinical trial

Safety and Efficacy of the Transfusion of UCB in Patients With an ASD Depending on the Degree of HLA Compatibility. (ASD-HLA2019)

ClinicalTrials.gov Identifier: **NCT04099381**

Conducted by

State-Financed Health Facility "Samara Regional Medical Center Dinasty"

With the financial support of

INBIO, LLC

medical care provided by

International Bioclinic (IBC, LLC)

The procedure

This is prospective, non-randomized (open-label) with control group study.

150 patients in three groups.

- 1 group – high HLA compatibility (≤4 of 6 HLA loci)
- 2 group - low HLA compatibility (≥4 of 6 HLA loci)
- 3 group – control group

Total of 2 Cord blood infusion with the delay of 6 months

Cell count ≤50 millions cells per kg of patient weight

100 millions cells when possible used

Allogenic Cord blood

Paton MCB, Wall DA, Elwood N, Chiang KY, Cowie G, Novak I, Finch-Edmondson M. Safety of allogeneic umbilical cord blood infusions for the treatment of neurological conditions: a systematic review of clinical studies. Cytotherapy. 2022 Jan;24(1):2-9. doi: 10.1016/j.jcyt.2021.07.001. Epub 2021 Aug 10. PMID: 34384698.

Common advantages

- Safe – used for transplant more than 30 years as HSC source;
- Highly active due they harvested in newborns (youngest adult cells);
- Contains much different cells with neuroprotection and immunologic preferences.

Private advantages

- Collected and stored in certified cord blood bank (EFI, WMDA, ISO);
- Most effective bank in Russia with more than 50 transplants worldwide.

ДИНАСТИЯ
ОБЛАСТНОЙ ЦЕНТР РЕПРОДУКТИВНОЙ МЕДИЦИНЫ

Cord blood application

- IV application – due it most safe procedure and in most cases not require any additional sedation even with ASD patients.
- IV application effective due the mononuclear cells can cross the brain barrier and cell secretome.
- No difference in effectiveness in comparing with other cell delivery methods but with difference in safety (IV most safe method)

Sanchez-Diaz M, Quiñones-Vico MI, Sanabria de la Torre R, Montero-Vílchez T, Sierra-Sánchez A, Molina-Leyva A, Arias-Santiago S. Biodistribution of Mesenchymal Stromal Cells after Administration in Animal Models and Humans: A Systematic Review. J Clin Med. 2021 Jun 29;10(13):2925. doi: 10.3390/jcm10132925. PMID: 34210026; PMCID: PMC8268414.

Miroslaw Janowski, Piotr Walczak, and Isao Date. Intravenous Route of Cell Delivery for Treatment of Neurological Disorders: A Meta-Analysis of Preclinical Results. Stem Cells and Development.Jan 2010.5-16.http://doi.org/10.1089/scd.2009.0271

Inclusion criteria

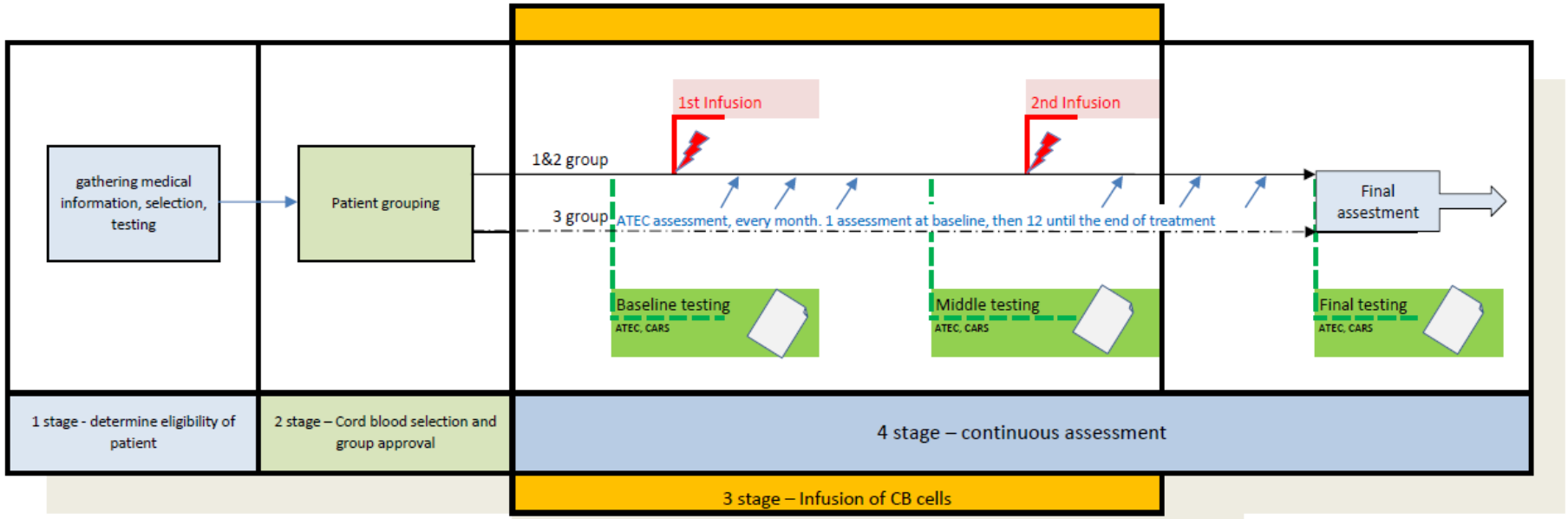
- Patient selection criteria (indications for this type of treatment):

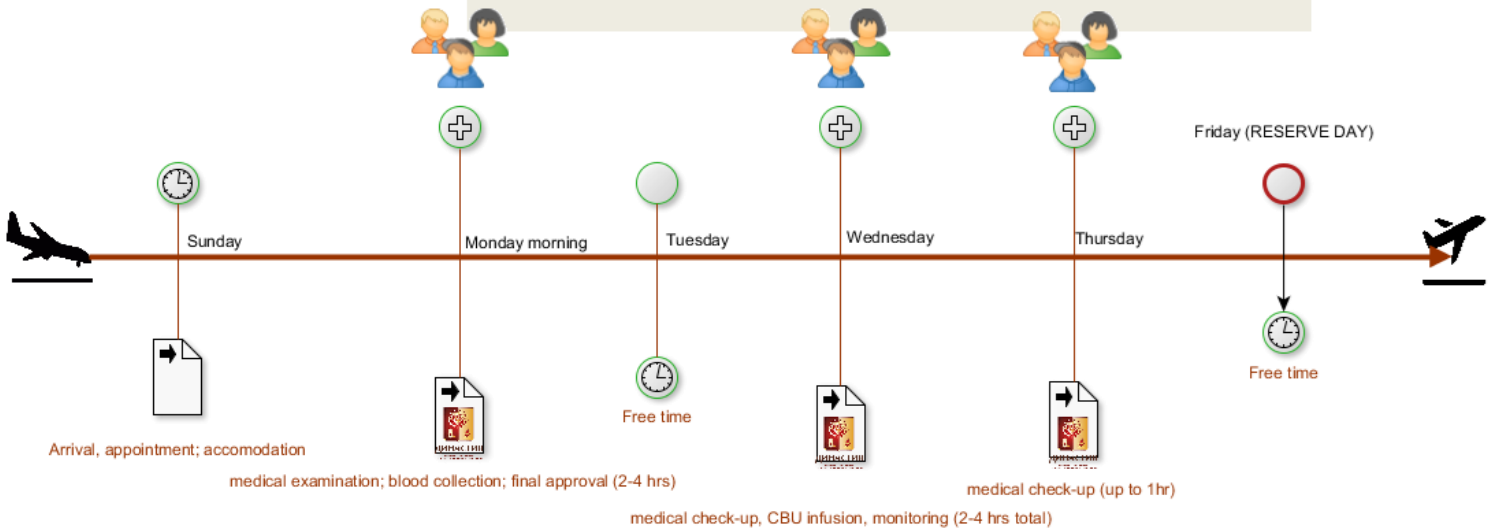
- Patient's age is from 4 to 14 years;
- Diagnosis: autism spectrum disorder;
- Severity of the disease according to ATEC scale not less than 16 points;
- Compatible allogeneic specimen suitable for infusion;
- Consent of parents (legal guardians).

Patient exclusion criteria (contraindications for this type of treatment):

- Patient's age up to 4 years, after 14 years;
- Presence of the following conditions in the history: heart failure at the stage of decompensation, stroke in the history less than 1 year ago, anemia and other blood diseases;
- Decompensation for chronic and endocrinological diseases;
- Acute respiratory viral and bacterial infections, less than 1 month after acute phase;
- HIV infection, hepatitis B and C;
- Oncological diseases, chemotherapy in history;
- Tuberculosis;
- Severe form of intellectual disability as a concomitant disease (at the discretion of the Center's doctors);
- Cerebral palsy in children;
- Fragile X chromosome syndrome;
- Seizures of epilepsy or anticonvulsant medication therapy in the last 6 months and/or history of seizures more often than once every 6 months.

Typical procedure





Studies and results

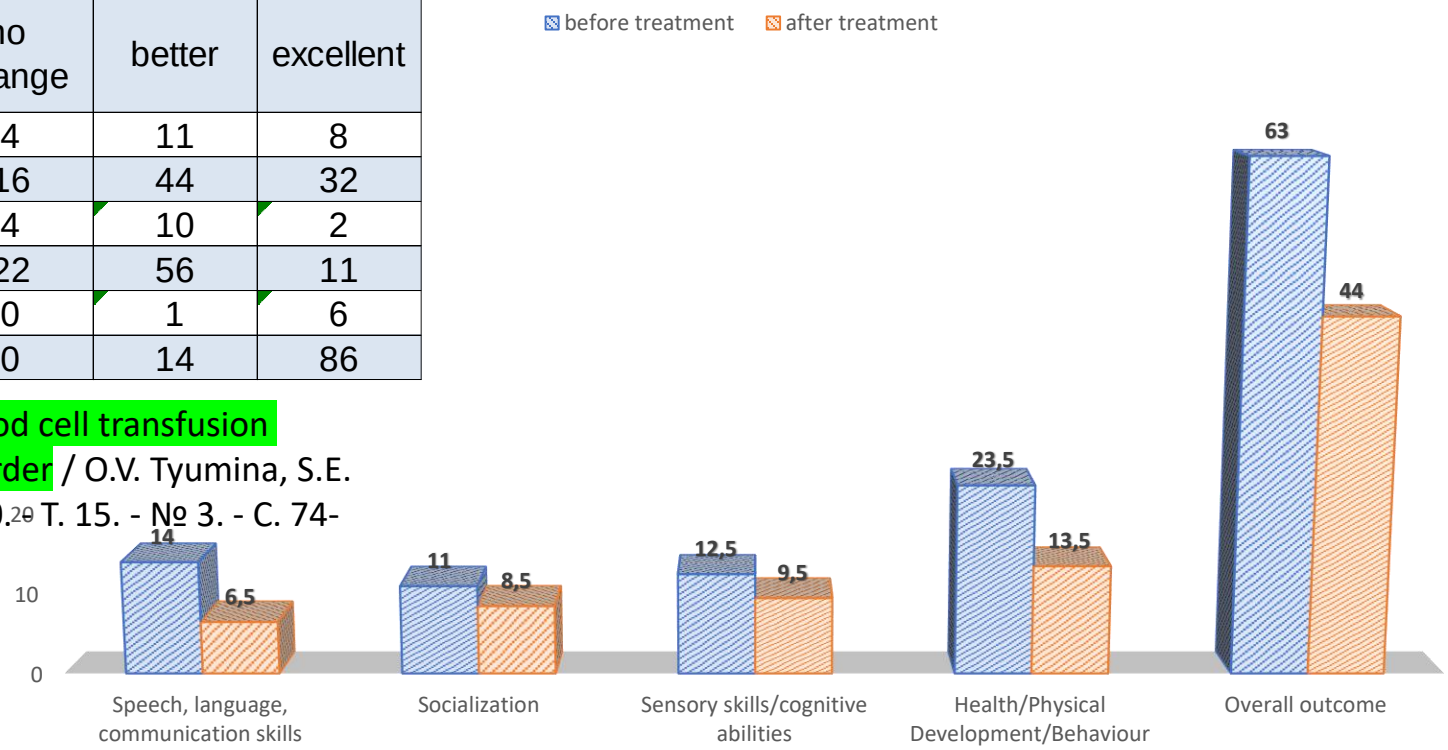
- 40 patients enrolled in ASD program.
- Received CB infusion procedure - 25

Nr	dates		number of infusions	behavior changes			
	1 infusion	2 infusion		bad	no change	better	excellent
total cases by type of change			**25**	2	4	11	8
			% of changes	8	16	44	32
with 1 infusion			**18**	2	4	10	2
			% of changes	11	22	56	11
with 2 infusions			**7**	0	0	1	6
			% of changes	0	0	14	86

of safety and efficacy of allogeneic hematopoietic cord blood cell transfusion methodEvaluation for patients with autism spectrum disorder / O.V. Tyumina, S.E. Volchkov, P.A. Ovchinnikov [et al] // Genes and Cells. - 2020. T. 15. - № 3. - C. 74-79. - DOI 10.23868/202011012. - EDN AEVFDV.

Villarreal-Martínez L, González-Martínez G, Sáenz-Flores M, Bautista-Gómez AJ, González-Martínez A, Ortiz-Castillo M, Robles-Sáenz DA, Garza-López E. Stem Cell Therapy in the Treatment of Patients With Autism Spectrum Disorder: a Systematic Review and Meta-analysis. Stem Cell Rev Rep. 2022 Jan;18(1):155-164. doi: 10.1007/s12015-021-10257-0. Epub 2021 Sep 13. PMID: 34515938.

Qu J, Liu Z, Li L, Zou Z, He Z, Zhou L, Luo Y, Zhang M and Ye J (2022) Efficacy and Safety of Stem Cell Therapy in Children With Autism Spectrum Disorders: A Systematic Review and Meta-Analysis. *Front. Pediatr.* 10:897398. doi: 10.3389/fped.2022.897398



About the clinic

South East European Conference on Autism
Hotel Mona Plaza, Belgrade, Jun 2-4, 2022.

The further Studies

- Low HLA matched CBU infusion selected by Kir receptor (UCB-Kir)
- Umbilical cord blood with Mesenchymal cells – combined (MSC-UCB combi)
- Umbilical cord blood with MSC Exosomes (UCB-MSC.EXO)
- Exosomes from mesenchymal cells in patients with ASD and CP (MSC.EXO)
- CD 14+ cells from UCB in patients with ASD and CP (CD14+ select)
- CD 14+ exosomes for patients with ASD and CP (CD14EXO)

Saha A, Patel S, Xu L, Scotland P, Schwartzman J, Filiano AJ, et al. (2019) Human umbilical cord blood monocytes, but not adult blood monocytes, rescue brain cells from hypoxic-ischemic injury: Mechanistic and therapeutic implications. PLoS ONE 14(9): e0218906. https://doi.org/10.1371/journal.pone.0218906