



British Inherited Metabolic Disease Group

John McIntyre Conference Centre,
The University of Edinburgh



Pre-meeting
Monday 16 June 2025

Annual Symposium
Tuesday 17 - Wednesday 18 June 2025

Poster list - Both days

Alphabetical by first presenting author surname

Posters marked with ❖ will be presented as a flash presentation

Poster No	Poster
1	Adjusting Dietary Therapy using Continuous Glucose Monitoring and Proposed Glycaemic Targets in Glycogen Storage Disease Type Ia: A Case Study Cameron Arbuckle ¹ , Dr Elaine Murphy ¹ ¹ National Hospital for Neurology and Neurosurgery, UK
2	Insights into aging among adults affected with Inherited Metabolic Diseases-one tertiary centre experience Dr John Bassett ¹ , Daniel Hand ¹ , Andrew Oldham ¹ , Emma Pickering ¹ , Dr Ana Jovanovic ¹ , Dr Samreen Safdar ¹ , Alison Woodall ¹ , Prof Emma Vardy ^{2,3} , Dr Karolina M Stepien ¹ ¹ Mark Holland Adult Inherited Metabolic Diseases Unit, Salford Royal Hospital, Northern Care Alliance NHS Foundation Trust, ² Oldham Care Organisation (part of the Northern Care Alliance NHS foundation trust), Rochdale Road, Oldham, OL1 2JH, ³ Manchester Academic Health Sciences Centre, School of Health Sciences, Faculty of Biology, Medicine and Health, The University of Manchester
3	Navigating Eliglustat Drug-Drug Interactions Through a Pharmacist-Led MDT Approach Daniel Bell ¹ , Alejandra de la Torre ¹ , Victoria Morgan ¹ , M Cherry May Sanchez ² ¹ Cambridge University Hospitals NHS FT, Cambridge, UK, ² Cancer Research UK Cambridge Centre, Cambridge, UK
4	Shaping Phenylketonuria research through patient and public involvement Giana Blaauw ¹ , Prof Anita MacDonald ² , Dr Sarah Durnan ¹ , Prof Jane Coad ³ ¹ Nottingham University Hospitals NHS Trust, Nottingham, England, ² Birmingham Women's and Children's NHS Foundation Trust, Birmingham, England, ³ School of Health Sciences, University of Nottingham and University Hospitals Coventry & Warwickshir, Nottingham and Coventry, England

5	A prolonged release compared to an amino acid protein substitute in classical PKU effect on morning phenylalanine and tyrosine concentrations Dr Anne Daly ¹ , Dr Sharon Evans ¹ , Dr Alex Pinto ¹ , Prof Anita MacDonald ¹ ¹ Birmingham Children's Hospital, Birmingham, UK
6	Attention to Sapropterin Administration: Can it Bring Clinical Advantage? Prof Anita MacDonald ¹ , Dr Martina Tosi ² , Dr Alex Pinto ¹ , Dr Anne Daly ¹ , Dr Catherine Ashmore ¹ , Dr Sharon Evans ¹ ¹ Department of Dietetics, Birmingham Women's and Children's Hospital, UK, ² Department of Health Sciences, University of Milan; Department of Pediatrics, Vittore Buzzi Children's Hospital, Italy
7	Familial Hypercholesterolemia in the Northwest of England: is it diagnosed too late? Silothabo Dliso ^{1,2} , Dr Clare Van Miert ² , Prof Joanne Blair ¹ ¹ Alder Hey Children's NHS Foundation Trust, UK, ² Liverpool John Moore's University, UK
8	Review of Patients Diagnosed with Biotin Thiamine Responsive Basal Ganglia disease in our centre Megan Dorman ¹ ¹ Great Ormond Street Hospital, London, UK
9	❖ Late-onset argininosuccinic aciduria unmasked by sodium valproate Robert Field ^{1,2} , Hongying Chen ³ , Aine Redmond ³ , Alex Dudley ³ , David Lewis-Smith ³ , Eavan McGovern ³ , Stephen Ryan ^{3,4} , Loai Shakerdi ¹ , James O'Byrne ¹ ¹ National Centre for Inherited Metabolic Disorders, Mater Misericordiae University Hospital, Ireland, ² Department of Neurology, Mater Misericordiae University Hospital, Ireland, ³ Department of Neurology, Beaumont Hospital, Ireland, ⁴ Department of Neurology, Connolly Hospital Blanchardstown, Ireland
10	❖ Adult Refsum Disease: Dietary management is more than only restricting phytanic acid intake Sarah Firman ^{1,2} , Jennifer Cook ^{1,2} , Imogen Hall ^{1,2} , Katie Yeung ^{1,2} , Steve King ^{1,2} , Dr Raphael Buttigieg ² , Dr Fiona Vaz ² , Dr Anthony S. Wierzbicki ² , Dr Radha Ramachandran ² ¹ Department of Nutrition and Dietetics, Guy's and St Thomas' NHS Foundation Trust, London, UK, ² Adult Inherited Metabolic Diseases, Guy's and St Thomas' NHS Foundation Trust, London, UK
11	Nutritional management of a successful multifetal PKU Pregnancy Suzanne Ford ¹ , Dr Nathan Cantley ¹ , Simone Whiteway ¹ , Dr Elisabeth Summers ¹ , Dr Helena Kemp ¹ ¹ North Bristol NHS Trust, Bristol, England
12	❖ Think Ammonia: The Survey Jonathan Gibson ¹ , Laura Smith van Carroll ¹ , Pavel Krepelka ¹ Metabolic Support UK, England
13	❖ Development of patient education/support for patients with Hereditary Fructose Intolerance (HFI) under the Addenbrooke's Metabolic Service Lisa Gaff ¹ , Sarah Donald ¹ , Ruby Cross ¹ , Dr Eleni Leventea ¹ , Dr Elizabeth Caller ¹ ¹ Addenbrookes Hospital, England
14	MADdening Results Secondary to Sertraline Dr Jessica Johnson ¹ , Dr Mohamed Ahmed ² , Dr Godfrey T. Gillett ¹ , Dr Adam Lomas ¹ ¹ Sheffield Teaching Hospitals NHS Foundation Trust, UK, ² York and Scarborough Teaching Hospitals NHS Foundation Trust, UK

15	<p>Post-baseline outcomes of the UK Early Access to Medicines Scheme registry for cipaglucoisidase alfa plus miglustat in late-onset Pompe disease Dr Elaine Murphy¹, Dr Duncan Cole², Dr Patrick Deegan³, Prof Tarekegn Geberhiwot⁴, Prof Derralynn Hughes⁵, Dr Robin Lachmann⁶, Dr Reena Sharma⁷, Vipul Jain⁸, Elizabeth Moffat⁹, Jasmine Rutecki⁸, Dr Sophie Clarke⁹, Prof Mark Roberts¹⁰</p> <p>¹Charles Dent Metabolic Unit, National Hospital for Neurology and Neurosurgery, University College London Hospitals, UK, ²University Hospital of Wales, UK, ³Lysosomal Disorders Unit, Addenbrooke's Hospital, UK, ⁴Institute of Metabolism and Systems Research, University of Birmingham, UK, ⁵Lysosomal Storage Disorders Unit, Royal Free London NHS Foundation Trust and University College London, UK, ⁶National Hospital for Neurology and Neurosurgery, University College London Hospitals, UK, ⁷The Mark Holland Metabolic Unit, Salford Royal Foundation NHS Trust, UK, ⁸Amicus Therapeutics, Inc., USA, ⁹Amicus Therapeutics UK Ltd, UK, ¹⁰Salford Royal NHS Foundation Trust, UK</p>
16	<p>❖ Does sertraline cause symptomatic non-genetic MADD? Dr R.P.M.M.R. Pathirana¹, Dr Ann Bowron¹, Dr Roy Talbot¹, Dr Yi Shiao Ng²</p> <p>¹Department of Blood Sciences, Royal Victoria Infirmary, The Newcastle Upon Tyne Hospitals, UK, ²Department of Neurosciences, Royal Victoria Infirmary, UK</p>
17	<p>❖ Healthcare provision and patient's outcomes in adolescents with Phenylketonuria: A UK centre experience Alex Pinto¹, Dr Anne Daly¹, Dr Sharon Evans¹, Catherine Ashmore¹, Prof Anita MacDonald¹</p> <p>¹Birmingham Children's Hospital, UK</p>
18	<p>5,10-Methenyltetrahydrofolate synthetase deficiency (MTHFS deficiency): expanding the clinical and biochemical phenotype Dr Sherry Fang¹, Dr Simon Pope², Dr Yael Hachohen³, Dr Lara Menzies⁴, Dr Preeya Rehsi¹</p> <p>¹Department of Paediatric Inherited Metabolic Disease, Great Ormond Street Hospital for Children NHS, UK, ²Neurometabolic Unit, Institute of Neurology, Queen Square, UK, ³Paediatric Neurology, Great Ormond Street Hospital for Children NHS, UK, ⁴Department of Clinical Genetics, Great Ormond Street Hospital for Children NHS, UK</p>
19	<p>Miglustat: a first-in-class enzyme stabiliser for late-onset Pompe disease Professor Mark Roberts¹, Professor Tahseen Mozaffar², Dr Barry J Byrne³, Professor Mazen M Dimachkie⁴, Dr Robert J Hopkin⁵, Professor Priya S Kishnani⁶, Professor Benedikt Schoser⁷, Professor Ans T van der Ploeg⁸, Dr Jon Brudvig⁹, Dr Brian Fox⁹, Dr Fred Holdbrook⁹, Mr Vipul Jain⁹, Mr Franklin Johnson⁹, Dr Jennifer Zhang⁹, Professor Giancarlo Parenti¹⁰</p> <p>¹Salford Royal NHS Foundation Trust, UK, ²University of California, USA, ³University of Florida, USA, ⁴University of Kansas Medical Center, USA, ⁵Cincinnati Children's Hospital Medical Center, USA, ⁶Duke University Medical Center, USA, ⁷Friedrich-Baur-Institute, LMU University Hospital, LMU Munich, Germany, ⁸Erasmus MC University Medical Center, Netherlands, ⁹Amicus Therapeutics, Inc., USA, ¹⁰Metabolic Unit, University of Naples Federico II, Italy</p>
20	<p>❖ Very long-chain acyl-CoA dehydrogenase deficiency (VLCADD) and sleeve gastrectomy for weight management Louise Robertson¹, Alice Johnson², Alistair Sharples³, Dr Charlotte Dawson¹</p> <p>¹University Hospitals Birmingham NHS Foundation Trust, UK, ²Royal Wolverhampton NHS Trust, UK, ³University Hospitals of North Midlands NHS Trust, UK</p>
21	<p>True Faces of Rare: Preferences for authentic imagery in disorder-specific materials by people living with rare diseases and their communities Laura Smith Van Carroll¹, Pavel Krepelka¹, Kirsty Hoyle¹, Dr Kamran Iqbal², Dr Tom Kenny²</p> <p>¹Metabolic Support UK, Manchester, UK, ²Chiesi UK, Manchester, UK</p>

22	Distinctive phenotype associated with Mitochondrial ATAD3 gene cluster duplication: a case series Dr Srividya Sreekantam ¹ , Dr Suresh Vijayaraghavan ¹ , Dr Saikat Santra ¹ , Dr Julian Raiman ¹ , Ms Louise Simmons ¹ , Dr Jane Cassidy ¹ , Chris Stockdale ¹ , Dr Mrinalini Rajimwale ² , Dr Sreedhara Nittur ³ , Dr Swati Naik ¹ ¹ Birmingham Women's and Children's Hospital, ² Coventry Hospital, ³ Singleton Hospital, Swansea
23	❖ Multisystem Involvement and Hypoalbuminemia in N-linked Congenital Disorder of Glycosylation (CDG): A Case Series Dr Nirubhan Veeraraghavan ¹ , Dr Hugh Lemonde ¹ , Dr Helen Mundy ¹ , Dr Dinusha Pandithan ¹ ¹ Guys and St Thomas Hospital NHS foundation trust, London, UK
24	Decompensating Inherited Metabolic Disorders and the Oral Emergency Regimen. The Adult Patient Experience in Bristol Simone Whiteway ¹ , Suzanne Ford ¹ ¹ North Bristol NHS Trust
25	Elevation of branched chain amino acids due to Branched Chain Amino Acid Transferase 2 deficiency (BCAT2): to treat or not to treat? Dr Guido Zago ¹ , Dr Marios Kaliakatsos ² , Dr Nazreen Kamarus Jaman ¹ , Dr Martina Messina ¹ , Alice Dianin ³ , Dr Laura Rubert ³ , Dr Andrea Bordugo ³ , Dr Giulia Rodella ³ , Dr Elena Piccoli ³ , Dr Preeya Rehshi ¹ ¹ Department of Paediatric Metabolic Medicine, Great Ormond Street Hospital NHS Trust, London, UK, ² Department of Paediatric Neurology, Great Ormond Street Hospital, London, UK, ³ Inherited Metabolic Diseases Unit and Regional Centre for Newborn Screening, Diagnosis and Treatment of Inherited Metabolic Diseases and Congenital Endocrine Diseases, Azienda Ospedaliera Universitaria Integrata, Verona, Italy, Verona, Italy

Poster list - Wednesday only posters
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26	Difficulties in diagnosing mild peroxisomal biogenesis disorders – a case example Sharon Colyer ¹ , Claire Hart ¹ , Jennie Raven ² , John Shepherd ² ¹ Sheffield Children's Hospital, UK, ² Hull Royal Infirmary, UK
27	KS-462-282: An alternative Krabbe Disease biomarker with excellent diagnostic potential James Cooper ¹ , Kate Neal ¹ , Christine Egerton ¹ , Karen Tylee ¹ , Dr Heather Church ¹ , Teresa HY Wu ¹ ¹ Manchester University NHS Foundation Trust, UK
28	Evaluating Reference Intervals for Galactose-1-Phosphate Uridyl Transferase: Integrating Biochemical and Genetic Data Philip Crook ¹ , Catherine Bradford ¹ Synnovis Analytics Ltd., London, UK
29	The Efficacy of Liquid Valine and Isoleucine Supplements in MSUD Dr Anne Daly ¹ , Dr Martina Tosi ² , Dr Alex Pinto ¹ , Dr Catherine Ashmore ¹ , Dr Sharon Evans ¹ , Prof Anita MacDonald ¹ ¹ Department of Dietetics, Birmingham Women's and Children's Hospital, UK, ² Department of Health Sciences, University of Milan; Department of Pediatrics, Vittore Buzzi Children's Hospital, Italy
30	Elevated 4-methylsterol and 4,4-dimethylsterol in microcephaly, congenital cataract and psoriasiform dermatitis syndrome due to methylsterol monooxygenase 1 (MSMO1) deficiency provides diagnostic and treatment response biomarker Dr James Davison ¹ , Dr Youssef Khalil ² , Dr Catherine Dennis ³ , Dr Tess McPherson ⁴ , Professor Peter Clayton ² ¹ Metabolic Medicine, Great Ormond Street Hospital, UK, ² UCL GOS Institute of Child Health, UK, ³ Clinical Genetics, Oxford University Hospitals, UK, ⁴ Dermatology, Oxford University Hospitals, UK
31	Evaluation of neurodevelopmental outcome after haematopoietic stem cell transplant (HSCT) in a patient with Triosephosphate isomerase deficiency (TPI-D) Carey Eldred ¹ , Sian Waller ¹ , Dr Robert Chiesa ² , Dr James Davison ¹ ¹ Great Ormond Street Children's Hospital - Metabolic Medicine Department, UK, ² Great Ormond Street Hospital - Bone Marrow Transplant Department, UK
32	An unusual case of argininosuccinic aciduria highlighting the challenges and importance of identification of argininosuccinic acid in amino acid analysis Dr Vicki Warburton ¹ , Rebecca Hopkins ¹ , Kinga Krzywdzinska ¹ , Kris-Mae Dela Isla ¹ , Tim Thorpe ¹ , Dr Paul Cook ² , Dr Efstathia Chronopoulou ³ , Dr Germaine Pierre ³ ¹ University Hospitals Bristol and Weston NHS Foundation Trust, UK, ² University Hospital Southampton NHS Foundation Trust, UK, ³ Bristol Royal Hospital for Children, UK

33	<p>FollowME Fabry Pathfinders registry: patient-reported outcomes in a cohort of patients on migalastat treatment for median 4 years</p> <p>Derralynn Hughes¹, Ulla Feldt-Rasmussen², Gere Sunder-Plassmann³, Aneal Khan⁴, Biliana O. Veleva-Rotse⁵, Joseph D. Giuliano⁵, Hai Jiang⁵, Vipul Jain⁵, Jasmine Rutecki⁵, Aleš Linhart⁶</p> <p>¹Royal Free London NHS Foundation Trust and University College London, UK, ²Rigshospitalet, Copenhagen University Hospital, Denmark, ³Medical University of Vienna, Austria, ⁴M.A.G.I.C. (Metabolics and Genetics in Canada) Clinic Ltd., University of Calgary, Cumming School of Medicine, Canada, ⁵Amicus Therapeutics, Inc., USA, ⁶Charles University and General University Hospital, Czech Republic</p>
34	<p>Retrospective Analysis of Vitamin B12 Dose Optimization in Methylmalonic acidaemias and Cobalamin Deficiency-Related Disorders: Insights from a Tertiary Metabolic Centre in the UK</p> <p>Dr Nazreen Kamarus Jaman¹, Dr Guido Zago¹, Dr James Davison¹, Dr Stephanie Grunewald¹, Melanie Mcsweeney¹, Megan Dorman¹, Marjorie Dixon¹, Rachel Skeath¹</p> <p>¹Great Ormond Street Hospital, London, UK</p>
35	<p>Continuous Glucose Monitoring in the GSD cohort of Addenbrooke's Metabolic Service</p> <p>Dr Eleni Leventea¹, Sarah Donald¹, Lisa Gaff¹</p> <p>¹Addenbrooke's Hospital, Cambridge, UK</p>
36	<p>Barriers and facilitators to clinical trial participation: improving accessibility, logistics, and awareness</p> <p>Helen Lycett¹, Samantha Wiseman¹, Alexandra Morrison¹</p> <p>¹Rare Disease Research Partners, Amersham, UK</p>
37	<p>Primary and secondary multiple acyl-coA dehydrogenase deficiency (MADD): clinical insights and treatment response</p> <p>Dr Eamon Mccarron¹, Dr Emma Murray¹, Neil Gilmore¹, Dr Gillian Hamilton¹, Sharon Coyler², Joanne Croft², Camilla Scott², Clarie Hart², Dr Estelle Healy¹, Dr Grainne Connolly¹, Dr Michael Kinney¹, Dr John McConville³, Dr Ashley Elliott^{1,4}</p> <p>¹Royal Victoria Hospital Belfast, Northern Ireland, ²Sheffield Children's Hospital, England, ³Ulster Hospital, Northern Ireland, ⁴Wellcome-Wolfson Institute of Experimental Medicine, Queen's University Belfast, Northern Ireland</p>
38	<p>Role of tele monitoring in rare disease management</p> <p>Alison Mckee¹, Nicola Mcstravick¹, Sophie Houghton¹, Dr Grainne Connolly¹, Dr Emma Murray¹, Laura Murphy¹, Joy Mcdonald¹</p> <p>¹Belfast Health and Social Care Trust, Belfast, Northern Ireland</p>
39	<p>Phenylketonuria (PKU) - A Transition Model for Rare Disease</p> <p>Nicola McStravick¹, Alison McKee¹, Sophie Houghton¹, Dr Grainne Connolly¹, Anne Grimsley¹, Nicky Courtney¹, Dr Siobhan O'Sullivan¹, Dr Caroline Hart¹, Emma Tracey¹</p> <p>¹Belfast Health and Social Care Trust, Belfast, UK</p>
40	<p>Glycogen Storage Disease type 3 & Ketogenic Diet Therapy – Case Report</p> <p>Camille Newby¹, Abigail Robotham¹, Victoria Wilkins¹, Sam Whiting¹, Catherine Armstrong¹, Germaine Pierre¹, Effie Chronopoulou¹</p> <p>¹Bristol Royal Hospital for Children, UK</p>
41	<p>Disorder or distraction: Considering the significance of an ACADSB gene variant in a young person with developmental delay</p> <p>Dr Mahdia Sami Obeda¹, Dr James Nurse¹, Dr Paul Cook¹, Dr Hugh Lemonde², Dr Katherine Lachlan¹</p> <p>¹Southampton General Hospital, UK, ²Evelina Children's Hospital, UK</p>

42	<p>How good is blood Phe control in Maternal PKU in Europe: results from 102 pregnancies</p> <p>Alex Pinto¹, Dr Kirsten Ahring², Manuela Ferreira Almeida³, Catherine Ashmore¹, Sarah Bailey⁴, Dr Amaya Bélanger-Quintana⁵, Prof Alberto Burlina⁶, Dr Duncan Cole⁴, Clare Dale⁷, Dr Anne Daly¹, Esther van Dam⁸, Dr Charlotte Dawson⁷, Dr Sharon Evans¹, Sarah Firman⁹, Diane Green¹⁰, Dr Tarekegn Hiwot⁷, Yteke Hoekstra⁸, Sarah Howe⁷, Dr Fatma Ilgaz¹¹, Christian Loro⁶, Nicola McStravick¹², Katie Rawlins⁹, Louise Robertson⁷, Prof Júlio César Rocha¹³, Iris Rodenburg⁸, Dr Danja Schulenburg-Brand⁴, Prof Francjan van Spronsen⁸, Dr Gisela Wilcox¹⁰, Alison Wodall¹⁰, Prof Anita MacDonald¹</p> <p>¹Birmingham Children's Hospital, UK, ²Copenhagen University Hospital, Rigshospitalet, Copenhagen, Denmark, ³Centro de Referência na área de Doenças Hereditárias do Metabolismo, Unidade Local de Saúde de Santo António, E.P.E. (ULSSA), Portugal, ⁴University Hospital of Wales, Wales, ⁵Hospital Universitario Ramón y Cajal, Spain, ⁶Padova University Hospital, Italy, ⁷University Hospitals Birmingham, UK, ⁸University Medical Centre Groningen, University of Groningen, The Netherlands, ⁹Guy's & St Thomas' NHS Foundation Trust, UK, ¹⁰Salford Royal Foundation Trust, UK, ¹¹Hacettepe University, Turkey, ¹²Royal Victoria Hospital, UK, ¹³NOVA Medical School (NMS), Faculdade de Ciências Médicas, (FCM), Universidade Nova de Lisboa, Portugal</p>
43	<p>Are Cystatin-C measurements useful for the surveillance of chronic kidney disease in Paediatric MMA patients?</p> <p>Dr Preeya Rehsi¹, Ms Gemma Meenan¹, Dr Matko Marlais², Ms Melanie McSweeney¹</p> <p>¹Department of Paediatric Inherited Metabolic Disease Great Ormond Street Hospital NHS Foundation Trust and Institute for Child Health London UK, ²Department of Paediatric Nephrology, Great Ormond Street Hospital for Children, London, UK</p>
44	<p>Managing the untreatable - the broader role of rapid whole genome sequencing in neurological regression</p> <p>Dr Saule Gasiunas¹, Dr Dexter Tarr¹, Dr Richard Curnock¹</p> <p>¹Willink Unit, St. Mary's Hospital, UK</p>
45	<p>Optimising Ketogenic Therapy in Multiple Acyl-CoA Dehydrogenase Deficiency: A Case Report</p> <p>Dr Fiona Vaz¹, Sarah Firman¹, Roqsana Ara¹, Jennifer Cook¹, Imogen Hall¹, Katie Yeung¹, Dr Radha Ramachandran¹</p> <p>¹Guy's and St Thomas' NHS Foundation Trust, UK</p>
46	<p>Optimising Peripheral Intravenous Catheter Insertion and Management in Out-of-Hospital Settings: Addressing Patient and Technical Factors, Enhancing Nurse Competency, and Promoting Evidence-Based Practices for Improved Outcomes</p> <p>Leoni Walker¹</p> <p>¹Lloyds Clinical, Harlow, UK</p>
47	<p>Discrepant urine biochemistry in a paediatric patient with Alkaptonuria</p> <p>Courtney Watt¹</p> <p>¹NHS Greater Glasgow and Clyde, Scotland</p>
48	<p>A Rare cause of rhabdomyolysis in a 12 year old girl</p> <p>Dr Ralph Wigley¹, Dr Alistair Horman¹, Dr Julien Baruteau¹</p> <p>¹Great Ormond Street Hospital, UK</p>
49	<p>A case of X-linked form of combined Methylmalonic aciduria and Homocysteinemia - Cbl X</p> <p>Natalia Olkhovich^{1,2}, Yuliia Zhyvytsia¹, Maryna Patsora¹, Natalia Samonenko¹, Natalia Pichkur¹, Natalia Mytsyk¹, Oksana Barvinska¹, Iryna Hrehul¹, Svitlana Kormoz¹, Yuliia Tymruk¹, Olena Kutsyk¹, Maryna Shulga¹, Natalia Petrenko¹, Lina Moshkivska¹, Anna Shilova¹ Tetiana Ivanova¹ Natalia Gorovenko^{2,3}</p> <p>¹National Ukrainian Childrens Hospital OKHMATDYT, ²Institute of Genetic and Regenerative Medicine, Kyiv, Ukraine, ³National University of Health named P.L. Shupyka, Kyiv, Ukraine</p>