



Abstract Book

Hydrocephalus2023

Hamburg, Germany | Aug 25-28

The Fifteenth Meeting of the Hydrocephalus Society

www.hydrocephalus-meeting.com



Hydrocephalus Society

International Society for Hydrocephalus
and Cerebrospinal Fluid Disorders

Program Overview

Friday, August 25th 2023

Pre Meeting Seminar

CCH - Hall A

12:30 - 16:15	Normal Pressure Hydrocephalus - PreMeeting Educational Seminar
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Saturday, August 26th 2023

CCH - Foyer

07:00 - 08:00	Registrations
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CCH - Hall G

CCH Hall D

08:00 - 08:30	Opening of the Meeting
08:30 - 09:00	Session 1: Marmarou Lecture
09:00 - 10:00	Session 2: Pediatric Hydrocephalus

09:00 - 10:00	Session 3: Adult Hydrocephalus Oral Presentations
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CCH - Foyer

10:00 - 10:30	Coffee Break & Exhibition
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CCH Hall G

CCH - Hall D

10:30 - 11:40	Session 4: Young Investigators Awards I
11:40 - 12:40	Hydrocephalus Society Annual General Meeting
12:40 - 13:50	Industry Sponsored Lunch Seminar
13:50 - 15:30	Session 5: Physiology of CSF Circulation

13:50 - 15:20	Session 6: Congenital and Pediatric Hydrocephalus Oral Presentations
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CCH - Foyer

15:30 - 16:15	Coffee Break & Exhibition
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CCH - Hall G

CCH - Hall D

16:15 - 17:45	Session 7: NPH and Spinal Stenosis - A chicken/egg problem? - Roundtable
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16:15 - 17:40	Session 8: Experimental Hydrocephalus Oral Presentations
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Sunday, August 27th 2023

CCH - Hall G

08:30 - 09:00	Session 9: Hydrocephalus in Animals
09:00 - 10:15	Session 10: Young Investigators Awards II
10:15 - 10:45	Special Session: ChatGPT jeopardy

CCH - Hall D

09:00 - 10:30	Session 11: Adult Hydrocephalus Oral Presentations
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CCH - Foyer

10:45 - 11:20	Coffee Break & Exhibition
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CCH - Hall G

11:20 - 12:40	Session 12: Neuroimaging
12:40 - 14:00	Industry Sponsored Lunch Seminar
14:00 - 15:30	Session 15: Hydrocephalus Society - EANS Joint Session on Arnold Chiari

CCH - Hall D

11:35 - 12:40	Session 13: Adult Hydrocephalus/ Clinical Symptoms, differential diagnosis - Oral Presentations
13:50 - 15:50	Session 16: Technical Advances in Treatment and Diagnostics Oral Presentations

CCH - Hall E

11:35 - 12:40	Session 14: Technical Advances in Treatment and Diagnostics Oral Presentations
13:50 - 15:40	Session 17: Adult Hydrocephalus Oral Presentations

CCH - Foyer

15:50 - 16:20	Coffee Break & Exhibition
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CCH - Hall G

16:00 - 17:30	Session 18: NPH Guidelines - Update on recent developments
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CCH - Hall D

16:20 - 17:40	Session 19: Intracranial Pressure Oral Presentations
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CCH - Hall E

16:20 - 17:30	Session 20: Adult Hydrocephalus Oral Presentations
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Monday, August 28th 2023

CCH - Hall G

08:00 - 09:15	Session 21: Adult Hydrocephalus - CSF leaks and ICP hypotension
09:15 - 10:15	Session 24: Technical Advances in Treatment and Diagnostics Oral Presentations

CCH - Hall D

08:00 - 09:15	Session 22: Adult Hydrocephalus Oral Presentations
09:15 - 10:15	Session 25: Idiopathic Intracranial Hypertension Oral Presentations

CCH - Hall E

08:00 - 09:15	Session 23: Adult Hydrocephalus Oral Presentations
09:15 - 10:15	Session 26: Neuroimaging Oral Presentations

CCH - Foyer

10:15 - 11:00	<i>Coffee Break & Exhibition</i>
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CCH - Hall G

11:00 - 12:30	Session 27: Shunt Complications
12:30 - 13:40	Industry Sponsored Lunch Seminar
13:40 - 15:10	Session 30: NPH: Diagnostics and treatment for all? - Thinking globally
15:25 - 16:25	Session 33: Closing of the Hydrocephalus Meeting

CCH - Hall D

11:00 - 12:30	Session 28: Oral Flash Presentations of e-Posters
13:40 - 15:20	Session 31: Oral Flash Presentations of e-Posters

CCH - Hall E

11:00 - 12:30	Session 29: Oral Flash Presentations of e-Posters
13:40 - 15:15	Session 32: Oral Flash Presentations of e-Posters

Detailed Program

Friday, August 25th 2023

Pre Meeting Seminar

CCH - Hall A

12:30 - 16:15	Normal Pressure Hydrocephalus - PreMeeting Educational Seminar Chairs: Uwe Kehler, Mats Tullberg, Sevil Yasar
12:30 - 13:00	Welcome and get together
13:00 - 13:10	Introduction to NPH Uwe Kehler
13:10 - 13:20	Symptoms and signs Mats Tullberg
13:20 - 13:30	Radiology Karin Kockum
13:30 - 13:40	Supplementary tests Giorgio Palandri
13:40 - 13:50	Treatment - Insertion of the ventricular catheter Mitsuhito Mase
13:50 - 14:00	Treatment - Surgical techniques of VP-shunts Laurence Watkins
14:00 - 14:10	Treatment - Surgical techniques of VA-shunts Fernando Hakim
14:10 - 14:20	Treatment - Surgical techniques of LP-shunts Yasuaki Inoue
14:20 - 14:30	Complications Uwe Kehler
14:30 - 15:00	Coffee Break
15:00 - 15:10	Longitudinal care Uwe Kehler
15:10 - 15:20	Outcome Michael Fritsch
15:20 - 15:30	Is age only a number for the treatment of NPH? Sevil Yasar
15:30 - 15:35	Why is NPH underdiagnosed Mats Tullberg
15:35 - 15:40	Why is NPH undertreated Uwe Kehler
15:40 - 16:15	Discussion

Saturday, August 26th 2023

CCH - Foyer

07:00 - 08:00	Registrations
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CCH - Hall G

08:00 - 08:30	Opening of the Meeting Chairs: Uwe Kehler, Mats Tullberg, Giorgio Palandri, Sevil Yasar
08:00 - 08:15	Welcome Address Uwe Kehler - Hydrocephalus Society and Hydrocephalus 2023 President
08:15 - 08:30	NPH, the Historical Perspective John Pickard
08:30 - 09:00	Session 1: Marmarou Lecture Chairs: Uwe Kehler, Ahmed Toma
08:30 - 09:00	The Journey through CSF Laurence Watkins
09:00 - 10:00	Session 2: Pediatric Hydrocephalus Chairs: Ulrich Thomale, Sylvia Shitsama
09:00 - 09:20	New Developments in the Treatment of Pediatric Hydrocephalus Ulrich Thomale
09:20 - 09:30	Differences in treatment of Pediatric and Adult Hydrocephalus Richard Edwards
09:30 - 09:40	Pediatric Hydrocephalus in East Africa Sylvia Shitsama
09:40 - 09:50	Non-invasive Techniques for assessing to ICP in Hydrocephalus Llewellyn Padayachy
09:50 - 10:00	Discussion

CCH Hall D

09:00 - 10:00	Session 3: Adult Hydrocephalus Oral Presentations Chairs: Nicole Keong, Jenny Larsson
09:00 - 09:10	Idiopathic Normal Pressure Hydrocephalus (iNPH) is common among noneagenarian in the Takahata Cohort Chifumi Iseki
09:10 - 09:20	iNPH in advanced age: profiling patients through quantitative variables. Liliana Mazza
09:20 - 09:30	Prevalence of idiopathic normal pressure hydrocephalus in older adult population in Shanghai, China—A population-based observational study Xuhao Fang
09:30 - 09:40	In 2023 is NPH still underdiagnosed? The social and economic burden of the problem Gianpaolo Petrella

09:40 - 09:50	Levels of inflammatory cytokines MCP-1, CCL4 and PD-L1 in CSF differentiate idiopathic normal pressure hydrocephalus from neurodegenerative diseases Madeleine Braun
09:50 - 10:00	A model of normal pressure hydrocephalus as a disorder of intracranial thermodynamics Michael Egnor

CCH - Foyer

10:00 - 10:30	<i>Coffee Break & Exhibition</i>
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CCH Hall G

10:30 - 11:40	Session 4: Young Investigators Awards I Chairs: Sevil Yasar, Mats Tullberg
10:30 - 10:40	Anti-biofouling self-cleaning ventricular catheter for hydrocephalus patients Haritosh Patel
10:40 - 10:50	Polyvinylpyrrolidone-coated catheters decrease choroid plexus adhesion and Improve flow/pressure performance in an In-vitro model of hydrocephalus Jordan Davies
10:50 - 11:00	Directed topographical changes to reduce cellular adhesion and ventricular wall pull in Aaron Gonzales
11:00 - 11:10	An In-vitro setup for testing of ventricular catheters under physiologic and pathophysiologic flow rates Ahmad Faryami
11:10 - 11:20	Novel 3D printed microfluidic chip for hydrocephalus treatment: Fabrication and in vitro evaluation Seunghyun Lee
11:20 - 11:30	Computer vision pipeline to synchronize cranio-spinal pressures with posture in chronic in-vivo trials Anthony Podgorsak
11:30 - 11:40	Prolonged spaceflight alters intracranial tissues, fluids and ocular morphology Katherine Warthen
11:40 - 12:40	Hydrocephalus Society Annual General Meeting
12:40 - 13:50	Industry Sponsored Lunch Seminar
13:50 - 15:30	Session 5: Physiology of CSF Circulation Chairs: Ahmed Thoma, Mark Luciano
13:50 - 14:05	Physiology of CSF Circulation Mirsolav Vukic
14:05 - 14:20	Glymphatics Per Kristian Eide
14:20 - 14:35	What can imaging tell about CSF Physiology Shigeki Yamada
14:35 - 14:50	Pathophysiology of Normal Pressure Hydrocephalus Mats Tullberg
14:50 - 15:05	NPH - Why does a shunt work?

Detailed Program

	Anders Eklund
15:05 - 15:30	Discussion

CCH - Hall D

13:50 - 15:20	Session 6: Congenital and Pediatric Hydrocephalus Oral Presentations Chairs: Sylvia Shitsama, Kristopher Kahle, Richard Edwards
13:50 - 14:00	Modeling congenital hydrocephalus genes SMARCC1 and TRIM71 in the Xenopus model system Ergin Deniz
14:00 - 14:10	Genetic determinants and molecular mechanisms of human cerebral ventricular size and congenital hydrocephalus Kristopher Kahle
14:10 - 14:20	Cerebrospinal fluid oscillations and cerebral blood flows in hydrocephalus premature infants who have had intraventricular hemorrhage Olivier Baledent
14:20 - 14:30	CSF-based extracellular vesicle signaling and related T-cell activation mediate the pathogenesis of post-hemorrhagic hydrocephalus Pat McAllister
14:30 - 14:40	The aetiological distribution of paediatric hydrocephalus in Asia: a systematic review and meta-analysis Eleanor Ferris
14:40 - 14:50	Patterns of clinical presentation of pediatric hydrocephalus at The National Center for Neurological Sciences 2017-2021 (Virtual) Nidaa Ahmed
14:50 - 15:00	"Virtual Off" on CertasPlus programmable valve... Not really off: Serendipitous clinical utility in patients with over-drainage symptoms Michael Muhonen
15:00 - 15:10	Adjustable ventriculoperitoneal shunt valve for the treatment of hydrocephalus in newborns Thomas Freiman
15:10 - 15:20	Discussion

CCH - Foyer

15:30 - 16:15	Coffee Break & Exhibition
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CCH - Hall G

16:15 - 17:45	Session 7: NPH and Spinal Stenosis - A chicken/egg problem? - Roundtable Chairs: Jan Malm, Giorgio Palandri
16:15 - 16:35	Lumbar Spinal Canal Stenosis and Hydrocephalus Luca Papavero
16:35 - 16:55	Cervical Spinal Stenosis and Hydrocephalus Benjamin Elder
16:55 - 17:15	Hydrocephalus and Spinal Canal Stenosis – the Influence on CSF Dynamics Anne Benninghaus
17:15 - 17:45	Panel Discussion

CCH - Hall D

16:15 - 17:40	Session 8: Experimental Hydrocephalus Oral Presentations Chairs: Carolyn Harris, Pat McAllister, Olivier Baledent
16:15 - 16:25	What can be learned from hydrocephalus induction failures? Maria Garcia Bonilla
16:25 - 16:35	Modulation of TLR-calpain pathway may prevent acquired hydrocephalus Lenadro Castaneyra Ruiz
16:35 - 16:45	Brain pathologic change due to ciliary dysfunction in chronic hydrocephalus model mice Kaito Kawamura
16:45 - 16:55	Exploring the influence of catheter materials on neuroinflammation and the intracranial microbiome Mark Luciano
16:55 - 17:05	Acute hydrocephalus and cortical neurodegeneration in Dnah5 knockout mice: exploring mechanisms and pathogenesis Koichiro Sakamoto
17:05 - 17:15	In-vitro evaluation of shunt valve flow dynamics Gwendolyn Williams
17:15 - 17:25	Quantitative analysis of flow and pressure changes through explanted biobank ventricular catheters Ahmad Faryami
17:25 - 17:35	A flow optimized ventricular catheter; flow redistribution, shear reduction, and reduced astrocytic activation Ahmad Faryami
17:35 - 17:40	Discussion

Sunday, August 27th 2023

CCH - Hall G

08:30 - 09:00	Session 9: Hydrocephalus in Animals Chairs: Uwe Kehler, Pat McAllister
08:30 - 08:50	Internal Hydrocephalus in Dogs and Cats - From Animal Models to Veterinary Neurosurgery and Back Martin Schmidt
08:50 - 09:00	Discussion
09:00 - 10:15	Session 10: Young Investigators Awards II Chairs: Ben Elder, Anne Benninghaus
09:00 - 09:10	Age at time of surgery does not influence the outcome in Idiopathic Normal Pressure Hydrocephalus – A population-based study Christine Chidiac
09:10 - 09:20	Prevalence of idiopathic normal-pressure hydrocephalus in Sweden - a population- based study of clinical and MRI findings in 70-year-olds Clara Constantinescu
09:20 - 09:30	Vascular risk factors, causes of death and 10-year mortality in INPH Sanna Eklund
09:30 - 09:40	Smartphone monitoring of multidomain gait parameters to facilitate remote monitoring of gait in Normal Pressure Hydrocephalus Aida Kamalian
09:40 - 09:50	Genome-wide association study in 1022 idiopathic normal pressure hydrocephalus patients Joel Rasanen
09:50 - 10:00	Aquaporin 4 in CSF in a large iNPH-cohort Johan Eriksson De Ryst
10:00 - 10:10	Endoscopic third ventriculostomy versus Ventriculoperitoneal shunt in the treatment of normal pressure hydrocephalus, Preliminary results of a randomized approach Loay Shoubash
10:10 - 10:15	Discussion

CCH - Hall D

09:00 - 10:30	Session 11: Adult Hydrocephalus Oral Presentations Chairs: Kyunghun Kang, Michael Williams, Thomas Freiman
09:00 - 09:10	Cerebrospinal fluid and intracranial blood rapid interactions in normal pressure hydrocephalus Olivier Baledent
09:10 - 09:20	Characteristics of human meningeal lymphatic vessels Per Kristian Eide
09:20 - 09:30	Urinary Incontinence and Normal Pressure Hydrocephalus: Some clues for what is still uncertain Isabella Mejia Michelsen
09:30 - 09:40	Multi-domain assessment of gait at baseline visit in Idiopathic Normal Pressure Hydrocephalus (iNPH) Megha Patel

Detailed Program

09:40 - 09:50	Audiovestibular symptoms in shunted idiopathic Normal Pressure Hydrocephalus Mark Luciano
09:50 - 10:00	AQP4 levels in CSF correlates with clinical severity in iNPH patients. A preliminary report Francesco Tuniz
10:00 - 10:10	Does ventriculomegaly correlate with intelligence and cognition? Neuropsychological findings and profile in longstanding overt ventriculomegaly of adults (LOVA) Lucia Darie
10:10 - 10:20	Cerebrospinal fluid formation rate in normal pressure hydrocephalus Sara Qvarlander
10:20 - 10:30	Reproducibility of The Timed 10 meter walking test in Normal Pressure Hydrocephalus Kanza Tariq

CCH - Hall G

10:15 - 10:45	Special Session: ChatGPT jeopardy
10:15 - 10:45	Interactive discussion with the attendees Sevil Yasar, Richard Edwards

CCH - Foyer

10:45 - 11:20	Coffee Break & Exhibition
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CCH - Hall G

11:20 - 12:40	Session 12: Neuroimaging Chairs: Shigeki Yamada, Karin Kockum, Katharina Wolf
11:20 - 11:35	Advances in 3D and 4D Imaging of Cerebrospinal Fluid and AI-Based Diagnosis of DESH Shigeki Yamada
11:35 - 11:45	Distinct cerebral cortical microstructural changes in idiopathic normal-pressure hydrocephalus Kyunghun Kang
11:45 - 11:55	Radiological morphological features and the associated intracranial pressure waveform components of idiopathic normal pressure hydrocephalus Matthias Jaeger
11:55 - 12:05	Reversibility of the radiological signs of raised intracranial pressure following intraparenchymal brain tumour resection Kanza Tariq
12:05 - 12:15	Iron-sensitive MR imaging of substantia nigra in normal pressure hydrocephalus. A quantitative approach Lubin Klotz
12:15 - 12:25	Respiratory and cardiac signal analysis of CSF dynamics in normal pressure hydrocephalus and Alzheimer's disease Petrice Cogswell
12:25 - 12:35	Structural volumetric and periodic table DTI patterns in Complex Normal Pressure Hydrocephalus – towards the principles of a translational taxonomy Nicole Keong
12:35 - 12:40	Discussion

CCH - Hall D

11:35 - 12:40	Session 13: Adult Hydrocephalus/Clinical Symptoms, differential diagnosis - Oral Presentations Chairs: Neill Graff-Radford, Laurence Watkins, Lucia Darie
11:35 - 11:45	The relationship between dual-task cost and cognitive performance among patients with probable idiopathic Normal Pressure Hydrocephalus Elizabeth Cray
11:45 - 11:55	Diffusion Tensor Imaging helps identify shunt-responsive Normal Pressure Hydrocephalus patients amongst probable iNPH cohort Adela Bubenikova
11:55 - 12:05	Long-term care in older person suspected of iNPH Eric Schmidt
12:05 - 12:15	Thirty years of experience in CSF dynamics testing in adult hydrocephalus Zofia Czosnyka
12:15 - 12:25	Cognitive changes after Tap Test in patients with Normal Pressure Hydrocephalus Isabella Mejia Michelsen
12:25 - 12:40	Discussion

CCH - Hall E

11:35 - 12:40	Session 14: Technical Advances in Treatment and Diagnostics Oral Presentations Chairs: Ki Su Park, Bryn Martin, Fabian Fluerebrock
11:35 - 11:45	Use of non-invasive ICP waveform monitoring in a CSF collection laboratory: experience and learning points Raphael Bertani
11:45 - 11:55	In vivo performance of the Kitea ICP System Sarah-Jane Guild
11:55 - 12:05	Validation of the Kitea ICP monitoring system over 6 months in sheep Sang Ho Kim
12:05 - 12:15	Safety of the Kitea ICP implant in the growing brain Sarah-Jane Guild
12:15 - 12:25	AI-trained mixed reality head-mounted display to place ventricular catheters -preliminary data Martin Mersch
12:25 - 12:35	Comparison of conventional- und robotic endoscopic third ventriculostomy in occlusive hydrocephalus Thomas Freiman
12:35 - 12:40	Discussion

CCH - Hall G

12:40 - 14:00	Industry Sponsored Lunch Seminar
14:00 - 15:30	Session 15: Hydrocephalus Society - EANS Joint Session on Arnold Chiari Chairs: Mansoor Foroughi, Giorgio Palandri
14:00 - 14:20	Defining Chiari, Chiari/Syrinx Aetiology & Surgery Techniques (Redo Surgery) (Virtual) Andrew Brodbelt
14:20 - 14:40	Surgical Principles, Risks, and Challenging Cases of Syringomyelia Marcus Stoodley
14:40 - 15:00	Complex Chiari/Redo Surgery & MIS Technique Paolo Bolognese
15:00 - 15:30	Discussion

CCH - Hall D

13:50 - 15:50	Session 16: Technical Advances in Treatment and Diagnostics Oral Presentations Chairs: Richard Edwards, Ki Su Park, Martin Mersch
13:50 - 14:00	Unravelling mechanisms driving ventricular catheter obstruction - a multicenter shunt biobank approach Prashant Hariharan
14:00 - 14:10	Blood GFAP, NFL and abeta42/40 Correlate Modestly With CSF levels in iNPH But Do Not Predict Short Term Response To CSF Diversion Alexandria Lewis
14:10 - 14:20	Watkins 2.0: the next generation In Gait-Assessment apps For Normal Pressure Hydrocephalus And decompensated long-standing overt ventriculomegaly Patients Kanza Tariq
14:20 - 14:30	Quantitative measurement of finger tapping before and after the tap test in idiopathic normal pressure hydrocephalus Yoko Shimizu
14:30 - 14:40	Machine learning analysis of voice data from patients with normal pressure hydrocephalus Ki-Su Park
14:40 - 14:50	Optimizing Gait and Balance Metric Acquisition from The "Tap Test" in Normal Pressure Hydrocephalus Philip Tipton
14:50 - 15:00	LP shunt in the patients with iNPH : Surgical technique Naoyuki Samejima
15:00 - 15:10	Neuralgia after Lumboperitoneal Shunt Can Be Reduced with Surgery under Local Anesthesia Yasuaki Inoue
15:10 - 15:20	Influence of ventricular size and surgical approach on flow distribution in ventricular catheters Cristopher Roberts
15:20 - 15:30	Impact of shunt placement in CSF dynamics Olivier Baledent
15:30 - 15:40	Shunt testing in vivo: Performance of Certas Valve integrated with SiphonGuard Marek Czosnyka
15:40 - 15:50	Discussion

CCH - Hall E

13:50 - 15:40	Session 17: Adult Hydrocephalus Oral Presentations Chairs: Laurence Watkins, Masakazu Miyajima, Stefanie Kaestner
13:50 - 14:00	Prognostic Significance Of Cerebrospinal Fluid production rate In Idiopathic Intracranial Hypertension and the impact of medical therapy Kanza Tariq
14:00 - 14:10	The PUMCH Evaluation System of Idiopathic Normal Pressure Hydrocephalus and Clinical Practice Junji Wei
14:10 - 14:20	Consistency and sensitivity analysis of instrumental and traditional methods for evaluating the CSF tap test (CSF-TT) responsiveness in patients with INPH. Chunyan Liu
14:20 - 14:30	CSF dynamics in long-standing overt ventriculomegaly in adults Alessandro Pirina
14:30 - 14:40	Effectiveness of the Clock Drawing test in the Tap Test Koichi Miyazaki
14:40 - 14:50	Efficacy and safety of a novel programmable valve (Sphera Pro®) in the treatment of idiopathic normal pressure hydrocephalus: a multicenter study. Rodolfo Reis
14:50 - 15:00	Shunting for idiopathic Normal Pressure Hydrocephalus: a Cochrane Systematic Review Christopher Carswell
15:00 - 15:10	Placebo-controlled effectiveness in INPH shunting (PENS) – Study Update Mark Luciano
15:10 - 15:20	Safety of Ventriculoperitoneal Shunt Placement in Patients with Idiopathic Normal Pressure Hydrocephalus in the Setting of Systemic Anticoagulation Benjamin Elder
15:20 - 15:30	Frailty and medium-term overall survival following ventriculoperitoneal shunting for patients with idiopathic Normal Pressure Hydrocephalus Elisabeth Cray
15:30 - 15:40	Discussion

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CCH - Foyer

15:50 - 16:20	Coffee Break & Exhibition
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CCH - Hall G

16:00 - 17:30	Session 18: NPH Guidelines - Update on recent developments Chairs: Mats Tullberg
16:00 - 17:30	Update on NPH Guidelines Mats Tullberg

CCH - Hall D

16:20 - 17:40	Session 19: Intracranial Pressure Oral Presentations Chairs: Marek Czosnyka, Aruna Rao
16:20 - 16:30	Analysis of Intracranial Pressure Pulse Shape Index in Normal Pressure Hydrocephalus Magdalena Kasprówska
16:30 - 16:40	Oscillation of ICP during walking is locked to head motion Eleanor Moncur
16:40 - 16:50	Cut-off point of the noninvasive measurement of intracranial compliance for the diagnosis of idiopathic Normal Pressure Hydrocephalus Gabriel Mendes
16:50 - 17:00	Relationship between body mass index and intracranial pressure waveform components in a cohort of patients with suspected idiopathic normal pressure hydrocephalus Matthias Jaeger
17:00 - 17:10	Prediction of optimal ICP level to achieve normalization of pulse amplitude Linda D'Antona
17:10 - 17:20	Characteristics of the M.scio Telemetric ICP Measurement System with Lumbar Catheter Anders Eklund
17:20 - 17:30	Early feasibility study of implantation of a telemetric ICP sensor in a commercial spaceflight participant Michael Williams
17:30 - 17:40	Effect of shunt adjustment on short term telemetric ICP readings Linda D'Antona

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CCH - Hall E

16:20 - 17:30	Session 20: Adult Hydrocephalus Oral Presentations Chairs: Madoka Nakajima, Per Kristian Eide, Giorgio Palandri
16:20 - 16:30	Age-stratified presentation and outcomes of ventriculoperitoneal shunt implantation in a cohort of normal pressure hydrocephalus (NPH) patients Zeid Abussaud
16:30 - 16:40	Effective shunt surgery for elderly patients after a fall with definite idiopathic normal pressure hydrocephalus can prevent the following fall Ryo Oike
16:40 - 16:50	Comparison of female and male outcomes in a cohort of normal pressure hydrocephalus (NPH) patients undergoing ventriculoperitoneal shunt implantation Zeid Abussaud
16:50 - 17:00	Baseline PROMIS Score Characteristics and Temporal Changes Following Shunt Placement in Patients with Idiopathic Normal Pressure Hydrocephalus Benjamin Elder
17:00 - 17:10	Self-experienced outcome after shunt surgery in patients with idiopathic normal pressure hydrocephalus in relation with objective clinical outcome and preoperative factors Johanna Rydja
17:10 - 17:20	Long-term cognitive and gait outcomes after primary endoscopic third ventriculostomy (TV) in adults from the AHCN with chronic obstructive hydrocephalus Thomas Zwimpfer

Monday, August 28th 2023

CCH - Hall G

08:00 - 09:15	Session 21: Adult Hydrocephalus - CSF leaks and ICP hypotension Chairs: Ahmed Toma, Eleanor Moncur, Thomas Zwimpfer
08:00 - 8:20	Spontaneous intracranial hypotension and CSF venous fistula Parag Sayal
08:20 - 08:30	Safety, sequelae, and efficacy of nerve root clipping in patients with spontaneous spinal CSF leaks. Amir El Rahal
08:30 - 08:40	Prognostic significance of cerebrospinal fluid production rate in the management of cerebrospinal fluid leak Kanza Tariq
08:40 - 08:50	Surgical closure of spinal CSF leaks improves symptoms in patients with superficial siderosis Amir El Rahal
08:50 - 09:00	CSF hydrodynamics in prolonged disorders of consciousness Eric Schmidt
09:00 - 09:10	Recovery and long-term outcome after neurosurgical closure of spinal CSF leaks in patients with spontaneous intracranial hypotension (SIH) Amir El Rahal
09:10 - 09:15	Discussion

CCH - Hall D

08:00 - 09:15	Session 22: Adult Hydrocephalus Oral Presentations Chairs: Ben Elder, Johan Virhammar
08:00 - 08:10	Impact of Ventriculoperitoneal Shunt on Systemic Hypertension Kanza Tariq
08:10 - 08:20	Cognitive Improvement after Endoscopic Third Ventriculostomy Surgery in Long-standing Overt Ventriculomegaly in Adults Daniele Piccolo
08:20 - 08:30	A systematic review of cognitive assessment methods and outcomes following shunt surgery in idiopathic normal pressure hydrocephalus (iNPH) Lisa Healy
08:30 - 08:40	Estimation of ventricular volume changes for smart shunt systems Fabian Fluerebrock
08:40 - 08:50	Reversal of apparent cerebral atrophy (Cerebral Pseudoatrophy) in Normal Pressure Hydrocephalus patients who have undergone ventricular shunt surgery Isabella Mejia Michelsen
08:50 - 09:00	Transcranial direct current stimulation for cognition improvement in postoperative normal pressure hydrocephalus patients with programmable pressure valves: A pilot study Tamires Giumaraes Cavalcante Carlos de Carvalho
09:00 - 09:10	Shunt readmission rates and factors influencing them in hydrocephalus of all etiologies across the age spectrum Abhay Moghekar
09:10 - 09:15	Discussion

CCH - Hall E

08:00 - 09:15	Session 23: Adult Hydrocephalus Oral Presentations Chairs: Llewellyn Padayachy, Mitsuhiro Mase, Dan Farahmand
08:00 - 08:10	Mechanical complications of Sophysa SM8 shunt in adult hydrocephalus: a monocentric experience Guillaume Coll
08:10 - 08:20	Incidence and nature of complications associated with ventriculoatrial shunt placement: A meta analysis Leonardo Oliveira
08:20 - 08:30	After 15 years, what is changed in the knowledge of hydrocephalus? Survey of Harold O. Conn 15 years later Gianpaolo Petrella
08:30 - 08:40	Reducing Over-Drainage Complications in Idiopathic Normal Pressure Hydrocephalus Adam Nunn
08:40 - 08:50	Time to Resolution of NPH-associated Subdural Hematomas Mark Luciano
08:50 - 09:00	Abdominal pain after ventriculoperitoneal shunting for normal pressure hydrocephalus (NPH): prevalence, timeline, and impact of quality of life Uwe Kehler
09:00 - 09:10	Frequency of abdominal pain related to types of shunt tubing: The difference in the tubing Kanza Tariq
09:10 - 09:15	Discussion

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CCH - Hall G

09:15 - 10:15	Session 24: Technical Advances in Treatment and Diagnostics Oral Presentations Chairs: Anne Benninghaus, Kanza Tariq, Magnus Tisell
09:15 - 09:25	Transendoscopic Ultrasound for Neuroendoscopy Klaus D M Resch
09:25 - 09:35	Choroid plexus-on-a-chip: a microfluidic model to study how cerebrospinal fluid secretion and blood-cerebrospinal fluid barrier function are affected by inflammation associated with hydrocephalus Prashant Hariharan
09:35 - 09:45	Patient-specific automated cerebrospinal fluid pressure control to augment spinal wound closure: A case series using the LIQUOGUARD Kanza Tariq
09:45 - 09:55	Validation and application of in silico and in vitro modeling to optimize cerebrospinal fluid drug delivery to the brain Bryn Martin
09:55 - 10:05	Quantification of Regional Neural Tissue Strain in Type I Chiari Malformation Gwendolyn Williams
10:05 - 10:15	Discussion

CCH - Hall D

09:15 - 10:15	Session 25: Idiopathic Intracranial Hypertension Oral Presentations Chairs: Ignacio Jusue Torres, Abhay Moghekar, Sogha Khawari
09:15 - 09:25	Correlation of cerebrospinal fluid and plasma adipokines in obese versus non-obese idiopathic intracranial hypertension (IIH) patients Sara Ho
09:25 - 09:35	A comparison of outcomes between pediatric and adult patients with idiopathic intracranial hypertension (IIH) Thaddeus Harbaugh
09:35 - 09:45	Long-term outcomes after dural venous stenting in Idiopathic intracranial hypertension: a single centre experience Muhammad Ahmad Kamal
09:45 - 09:50	IIH Intervention: opening of a randomised clinical trial comparing Dural Venous Sinus Stenting with Cerebrospinal Fluid shunting in Idiopathic Intracranial Hypertension Gopiga Thanabalasundaram
09:50 - 10:00	ICP dynamics during movement in Chiari malformation and idiopathic intracranial hypertension Eleanor Moncur
10:00 - 10:10	Synthetic MRI: a fast and reliable method for ventricular volumetry Rafael Holmgren
10:10 - 10:15	Discussion

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CCH - Hall E

09:15 - 10:15	Session 26: Neuroimaging Oral Presentations Chairs: Madoka Nakajima, Ville Leinonen, Katarina Laurell
09:15 - 09:25	Non-invasive phase-contrast MRI in idiopathic intracranial hypertension - first promising data from a prospective study Katharina Wolf
09:25 - 09:35	Cerebral arterial dynamic in hydrocephalus patients Kimi Owashi
09:35 - 09:45	Intracranial CSF-ISF Flow Patterns in Large Animal Model Mark Luciano
09:45 - 09:50	Optic nerve sheath diameter distension in normal pressure hydrocephalus: a potential marker for shunt responsiveness Linda D'Antona
09:50 - 10:00	Potential impact of non-invasive phase-contrast MRI in the diagnosis of spontaneous intracranial hypotension Katharina Wolf
10:00 - 10:15	Discussion

CCH - Foyer

10:15 - 11:00	Coffee Break & Exhibition
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CCH - Hall G

11:00 - 12:30	Session 27: Shunt Complications Chairs: Uwe Kehler, Mats Tullberg
11:00 - 11:05	Annouement Honorary Member: Hazel Jones Introduction: Mats Tullberg, Uwe Kehler
11:05 - 11:20	Avoidable Complications in Hydrocephalus Stefanie Kaestner
11:20 - 11:30	Complications of Ventricular Shunt Placement Mitsuhiro Mase
11:30 - 11:40	Complications of VA Shunts Giorgio Palandri
11:40 - 11:50	Complications of VP Shunts Fernando Hakim
11:50 - 12:00	Complications of LP Shunts Ahmed Toma
12:00 - 12:30	Panel Discussion
12:30 - 13:40	Industry Sponsored Lunch Seminar

CCH - Hall D

11:00 - 12:30	Session 28: Oral Flash Presentations of e-Posters Chairs: Fernando Pinto, Eric Schmidt, Nina Sundstroem
11:00 - 11:05	Reversible dementia project (REVERT): impact on improvement in awareness, diagnosis and management of normal pressure hydrocephalus Peter Smielewski
11:05 - 11:10	Bowel and urinary incontinence in idiopathic normal pressure hydrocephalus Andreas Eleftheriou
11:10 - 11:15	Temporo-spatial gait parameters alteration after tap test in patients with idiopathic normal pressure hydrocephalus Sunee Bovonsunthonchai
11:15 - 11:20	Incidence and outcomes of chronic secondary hydrocephalus at a tertiary neurosurgical centre: a 3.5 year retrospective observational study Fatema Rezai
11:20 - 11:25	Expression analysis of motor activity related genes to predict idiopathic normal pressure hydrocephalus Madoka Nakajima
11:25 - 11:30	Long-term outcomes of normal pressure hydrocephalus patients with CSF shunt: A systematic literature review and meta analysis Kim Wouters
11:30 - 11:35	The incidence of postdural puncture headache by lumbar puncture in patients with hydrocephalus is lower than in younger patients Masayuki Yamagishi
11:35 - 11:40	Contemporary management of patients with normal pressure hydrocephalus (NPH) - an international survey Ganesalingam Narenthiran

Detailed Program

11:40 - 11:45	Our preliminary experience on the combination of neuropsychological assessment and intrathecal pressure measurement to settle the diagnostic dilemma of the normal pressure hydrocephalus Gianpaolo Petrella
11:45 - 11:50	A multidisciplinary team approach to managing normal pressure hydrocephalus: insights from a new service at the Royal Victoria Infirmary Ian Coulter
11:50 - 11:55	Variation of intracranial pressure and pulse amplitude amongst different types of hydrocephalic conditions and cerebrospinal fluid dynamic disorders Lucia Darie
11:55 - 12:00	A decade of academic publications on NPH and IIH Linda D'Antona
12:00 - 12:05	Concussions and idiopathic normal pressure hydrocephalus: Is there a correlation? Mack Hancock
12:05 - 12:10	Low Pressure Hydrocephalus Adela Bubenikova
12:10 - 12:15	CSF biomarkers as predictive markers of outcome after CSF diversion in patients with normal pressure hydrocephalus Zeid Abussuud
12:15 - 12:20	Non-Invasive ICP Waveform Monitoring for Assessment and Treatment Response in CSF Hypotension due to Spontaneous Occult CSF Fistulas: A Case Series Raphael Bertani
12:20 - 12:25	Exploring neurophysiology through monitoring the ICP waveforms in shunted pregnant patients with a non-invasive device - a case series Tamires Giumaraes Cavalcante Carlos de Carvalho
12:25 - 12:30	Patients with normal pressure hydrocephalus have fewer enlarged perivascular spaces in the centrum semiovale Aaron Switzer

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CCH - Hall E

11:00 - 12:30	Session 29: Oral Flash Presentations of e-Posters Chairs: Mark Luciano, Bryn Martin
11:00 - 11:05	Beyond antibiotics: the therapeutic benefits of ventricular irrigation for ventriculitis Ahmed Al Menabbawy
11:05 - 11:10	When you think the shunt is working, but it's not: Distal catheter obstruction in patients with ventriculoperitoneal shunt, a case series Isabella Mejia Michelsen
11:10 - 11:15	Exteriorization of a Ventriculoperitoneal Shunt through the urethra in a pediatric patient: Literature review and case report Silvio De Oliveira Junior
11:15 - 11:20	Deaths due to Hydrocephalus treatment in Brazil from 2012 to 2022 Silvio De Oliveira Junior
11:20 - 11:25	Is a Ventriculoatrial Shunt the first-line option for management of hydrocephalus in adult patients? Isabella Mejia Michelsen
11:25 - 11:30	Ventriculo-gallbladder shunt: Literature review and case report Silvio De Oliveira Junior

11:30 - 11:35	Managing Shunt Dysfunction with Non-invasive Intracranial Pressure Waveform Monitoring Raphael Bertani
11:35 - 11:40	Trends in hydrocephalus and CSF dynamics disorders research: A qualitative analysis of the hydrocephalus society abstracts Linda D'Antona
11:40 - 11:45	Dural venous stenting for treatment of idiopathic intracranial hypertension Petr Skalicky
11:45 - 11:50	How change the vestibulo-oculomotor reflex (VOR) in NPH shunted patients: study on the use the Video Head Impulse Gianpaolo Petrella
11:50 - 11:55	mFI11 as a Predictor of Post-Operative Infections in Ventriculo-Peritoneal Shunt Surgery Francesco Tuniz
11:55 - 12:00	Callosal angle is more useful than Evans index for postoperative follow-up of normal pressure hydrocephalus Hisayuki Murai
12:00 - 12:05	Non-invasive P2/P1 Ratio Analysis as a Potential Auxiliary Diagnostic and Follow-up Criterion for Normal Pressure Hydrocephalus in Patients Undergoing Ventriculoperitoneal Shunt Surgery Raphael Bertani
12:05 - 12:10	Do Evans index and callosal angle correlate with neurological improvement after shunt surgery in idiopathic normal pressure hydrocephalus? Rodolfo Reis
12:10 - 12:15	Development of web-apps for calculating Evans' Index, iNPH Radscale, iNPH Scale and ETVSS Ganesalingam Narethiran
12:15 - 12:20	Is the valve really necessary in patients with normal pressure hydrocephalus? Lowering the opening pressure to zero - a prospective single center observational study. Michele Dibenedetto
12:20 - 12:30	Discussion

CCH - Hall G

13:40 - 15:10	Session 30: NPH: Diagnostics and treatment for all? - Thinking globally Chairs: Uwe Kehler, Michael Williams, Sylvia Shitsama
13:40 - 13:50	Introduction and: What is the Minimum we Need to Diagnose NPH Uwe Kehler
13:50 - 14:00	Affordable Imaging Techniques with High Predictable Values Karin Kockum
14:00 - 14:10	What is the Most Affordable but Still Acceptable Shunt Device? Fernando Pinto
14:10 - 14:20	What is the Age Limit for NPH Treatment? Sevil Yasar
14:20 - 14:30	Cost of Hydrocephalus Treatment in Developing and Low-Income countries Magnus Tisell
14:30 - 15:10	Panel Discussion

CCH - Hall D

13:40 - 15:20	Session 31: Oral Flash Presentations of e-Posters Chairs: Yasuaki Inoue, Anders Eklund, Dominik Zieglaensberger
13:40 - 13:45	Verification of the Stroop test Application Software for patients of idiopathic Normal Pressure Hydrocephalus Chihiro Kamohara
13:45 - 13:50	Evaluation of non-invasive ICP waveform and intracranial compliance monitoring technology in a pediatric neurosurgical outpatient clinic Raphael Bertani
13:50 - 13:55	What can the prevalence of pediatric hydrocephalus in Colombia - an upper-middle-income South-American country - tell us? Isabella Mejia Michelsen
13:55 - 14:00	Epilepsy in Hydrocephalus Patients (Virtual) Mohammed Nooruldeen Jabbar
14:00 - 14:05	Polyvinylpyrrolidone-coated Ventricular Catheter did not show Cellular Immunoreaction or Adhesion in Choroid Plexus Obstruction Michael Muhonen
14:05 - 14:10	Traumatic stress and shunt failure: a link between psychology and inflammation Brandon Rocque
14:10 - 14:15	Time course and Clinical Presentation variants for Cerebrospinal fluid diversion device failure in Slit ventricle syndrome. An observational study with 5 years follow up Mohamed Alsayw
14:15 - 14:20	Shift of blood and CSF volume between the intracranial and intraspinal compartments during positional change Andreas Spiegelberg
14:20 - 14:25	Volume changes in cerebral vascular and CSF compartments in hydrocephalus patients Kimi Owashi
14:25 - 14:30	Analysis of transcranial Doppler pulse waveforms in the diagnosis of hydrocephalus Arkadiusz Ziolkowski
14:30 - 14:35	Pulsatility and CSF flow resistance in patients with suspected idiopathic hydrocephalus Olivier Baledent
14:35 - 14:40	Two HTRA1-related autosomal dominant cerebral small vessel disease combined normal pressure hydrocephalus Qiong Yang
14:40 - 14:45	Assessing the relationship between ventricular catheter obstruction and flow using computational fluid dynamics and a multicenter clinical biobank Christopher Roberts
14:45 - 14:50	Shunting in normal pressure hydrocephalus: Are we reaching their full potential? David Rowland
14:50 - 14:55	The importance of hydrostatic compensation in lumboperitoneal shunts in Hydrocephalus communicans August von Hardenberg
14:55 - 15:00	Impact Of Global Warming On Brain Temperature Kanza Tariq
15:00 - 15:05	Craniometric points for ventricular access, analytical study between history and current trends Ehab El Refaee
15:05 - 15:20	Discussion

CCH - Hall E

13:40 - 15:15	Session 32: Oral Flash Presentations of e-Posters Chairs: Sara Qvarlander, Zofia Czosnyka, Doerthe Ziegelitz
13:40 - 13:45	Machine Learning-led Exploration of Imaging Biomarkers distinguishing NPH vs. controls: Pilot and Test Perturbations Reveal the Robustness of Feature Extraction Nicole Keong
13:45 - 13:50	Cerebrospinal fluid oscillations and cerebral blood flows during breathing Olivier Baledent
13:50 - 13:55	Monitoring patients with CSF disorders – potential use of phase-contrast MRI Katharina Wolf
13:55 - 14:00	Negative pressure Hydrocephalus and its great therapeutic challenge: Experience in our center Patricia Barrio Fernandez
14:00 - 14:05	Posterior Reversible Encephalopathy Syndrom (PRES) secondary to two cases of intracranial hypotension Patricia Barrio Fernandez
14:05 - 14:10	Bone Regrowth After Burr Hole Craniostomy: Establishing natural history and implications for post-operative trans-burr hole ultrasound Mark Luciano
14:10 - 14:15	Preclinical quality testing of the M.scio system for the early feasibility study of telemetric intracranial pressure monitoring in spaceflight Andreas Bunge
14:15 - 14:20	Slow waves of ICP and blood flow velocity in hydrocephalus Marek Czosnyka
14:20 - 14:25	Telemetric intracranial pressure recordings in patients with shunts for complex hydrocephalus Ajmal Bin Hassan
14:25 - 14:30	Changes in the shape of intracranial pressure pulse waveform correlate with cerebrospinal compliance during lumbar infusion tests Agnieszka Kazimierska
14:30 - 14:35	Phasic alertness and working memory improvements following lumbar puncture in iNPH patients differ from other age-associated cognitive syndromes Nicolas Loebig
14:35 - 14:40	Trends in ICP waveform in the early postoperative period: Does sedation play a relevant role? Linda D'Antona
14:40 - 14:45	Exchange of Fixed Pressure Gravitational Unit to an Adjustable Gravitational Valve is Safe and Effective Procedure Ivan Matvejevs
14:45 - 14:50	Chiari malformation type 1 without hydrocephalus and third ventriculotomy Ivona Nemeiko
14:50 - 14:55	Cerebrospinal fluid tau biomarkers show strong potential in early selection for shunt surgery Yan Xing
14:55 - 15:00	Effect of shunt treatment on Epworth sleepiness scale score in normal pressure hydrocephalus Simon Liden
15:00 - 15:05	Cerebral Blood Flow and Autoregulation in Normal Pressure Hydrocephalus Afroditi Lalou
15:05 - 15:10	Explore the relationship between global white matter and idiopathic normal pressure hydrocephalus triad Hongliang Li
15:10 - 15:15	Discussion

Detailed Program

CCH - Hall G

15:25 - 16:25	Session 33: Closing of the Hydrocephalus Meeting Chairs: Uwe Kehler, Sevil Yasar, Mats Tullberg, Mitsuhiro Mase, Jan Malm
15:25 - 15:40	Highlights from Hydrocephalus 2023 Jan Malm
15:40 - 15:50	Announcement of the Young Investigators Awards Winners Sevil Yasar
15:50 - 16:00	Closing Address Uwe Kehler
16:00 - 16:10	Hydrocephalus Society Change of Presidency Ceremony Mats Tullberg, Uwe Kehler
16:10 - 16:20	Welcome to Hydrocephalus 2024 Mitsuhiro Mase
16:20 - 16:25	End of Hydrocephalus 2023 Uwe Kehler

e-Posters - All days - available through the mobile app and screens

HYDROFLEX: THE USE OF PATIENT REPORTED OUTCOMES IN A CLINICAL SETTING AMONG PATIENTS WITH HYDROCEPHALUS

[Anne Sofie Graversen](#)

INFLAMMATORY MARKERS AS PREDICTORS OF SHUNT DEPENDENCY AND FUNCTIONAL OUTCOME IN PATIENTS WITH ANEURYSMAL SUBARACHNOID HEMORRHAGE

[Marianne Juhler](#)

NON-INVASIVE ASSESSMENT OF INTRACRANIAL PRESSURE AMONG OUTPATIENT SUBJECTS

[Raphael Bertani](#)

RISK FACTORS FOR SLIT VENTRICLE IN THE HYDROCEPHALUS CHILDREN TREATED WITH VENTRICULO-PERITONEAL SHUNT

[Sadahiro Nomura](#)

METABOLISMS REGULATING GENES OF CHRONIC HYDROCEPHALUS IN THE AGED HUMAN CAUDATE NUCLEUS

[Joon Shim](#)

AN INVESTIGATION OF THE USEFULNESS OF THE REY-15 COGNITIVE PERFORMANCE VALIDITY TEST, TO DETECT SUBOPTIMAL EFFORT ON PATIENTS WITH SUSPECTED INPH

[Elizabeth Cray](#)

ASSESSMENT OF POSTURAL STABILITY IN PATIENTS WITH IDIOPATHIC NORMAL PRESSURE HYDROCEPHALUS

[Eunhee Park](#)

DISTAL CATHETER MIGRATION IN VENTRICULOPERITONEAL SHUNT: GASTRIC PERFORATION AND SCROTAL MIGRATION - REPORT OF TWO UNCOMMON CASES

[Patricia Barrio](#)

GAIT IMPROVEMENT FOLLOWING CEREBROSPINAL FLUID TAP TEST IN NORMAL PRESSURE HYDROCEPHALUS PATIENTS WITH STRIATAL DOPAMINERGIC DEFICIT: A PRELIMINARY STUDY

[Minju Kim](#)

SLIT VENTRICLE WITHOUT SUBDURAL HEMATOMA AFTER VENTRICULO-ATRIAL SHUNT FOR INPH

[Kiyoshi Takagi](#)

IS NAUSEA DURING LUMBAR DRAINAGE A USEFUL PREDICTOR OF SHUNT RESPONSIVENESS?

[Zeid Abussuud](#)

EARLY EMERGENCE OF ISOLATED FOURTH VENTRICLE FOLLOWING MENINGITIS IN ADULT: A CASE REPORT

[Han Lin Yen](#)

DOES THE INTENSIVE CARE MONITOR SHOW THE CORRECT INTRACRANIAL PRESSURE? COMPARISON OF MONITOR OUTPUT VALUES WITH RAW DATA FROM HIGH-FREQUENCY RECORDINGS

[Carl Benjamin Bluemel](#)

THEOPHYLLINE A DRUG EFFICIENT TO INCREASE INTRACRANIAL PRESSURE: CASE REPORT AND REVIEW OF LITERATURE

[Lucia Darie](#)

SPINAL TUMOURS AS CAUSE OF NORMAL PRESSURE HYDROCEPHALUS: A CASE SERIES

[Zeid Abussuud](#)

SYNDROMIC VALIDITY OF INPH

[Eric Schmidt](#)

**MANAGEMENT OF A MASSIVE LATERAL MYELOMENINGOCELE AND HYDROCEPHALUS:
A SURGICAL PERSPECTIVE AND LITERATURE OVERVIEW**

[Ahmed Al Menabbawy](#)

ABMS-2 EVALUATION IN INPH DIAGNOSIS

[Masamichi Atsuchi](#)

**SHUNT-DEPENDENT POST-TRAUMATIC HYDROCEPHALUS: PREDICTORS AND LONG-TERM
FUNCTIONAL OUTCOMES**

[Hao Xu](#)

**THE IMPACT OF A STANDARDIZED SURGICAL PROTOCOL ON SHUNT REVISION IN PEOPLE WITH
IDIOPATHIC INTRACRANIAL HYPERTENSION AND A PRE-EXISTING SHUNT.**

[Yousra Rasool, Joseph Welch](#)

**LONG-TERM FUNCTIONALITY AND REVISION RATE OF TWO DIFFERENT SHUNT VALVES IN
PEDIATRIC AND ADULT PATIENTS**

[Thomas Freiman](#)

**PACKAGING DESIGNS FOR MEDICAL DEVICE DRUG COMBINATION PRODUCTS - IMPACT ON
REQUIRED STORAGE CONDITIONS AND SHELF-LIFE**

[Lucas Thieme](#)

**TECHNICAL ANALYSIS OF HYDROCEPHALUS SHUNT REVISIONS: HOW DO WE INVESTIGATE?
WHAT DO WE LEARN? THE IMPORTANCE OF DATA FOR PATIENTS, CLINICS & INDUSTRY!**

[August von Hardenberg](#)

NORMAL PRESSURE HYDROCEPHALUS AND CEREBRAL ATROPHY: A SCOPING REVIEW

[Afroditi Lalou](#)

**MINIMAL INVASIVE NEUROSURGERY (MIN) AND OPHTHALMOLOGY: OBSERVATION SERIES OF
COMPLEX HYDROCEPHALUS CASES**

[Klaus D M Resch](#)

**IDIOPATHIC NORMAL PRESSURE HYDROCEPHALUS IN A KLINEFELTER SYNDROME THE FIRST
CASE IN THE LITERATURE**

[Gianpaolo Petrella](#)

KEY CONCEPTS IN MIN: APPLICATION IN COMPLEX HYDROCEPHALUS

[Klaus D M Resch](#)
