

Ultrasound in psychoneurological correction of autistic disorders for effective treatment



Authors:

Ulyana Lushchyk, Igor Babii, Viktor Novytskyy,
Nadiya Lushchyk, Viktor Jr. Novytskyy, Sergiy Sazchenko

Veritas Research Center (Kyiv, Ukraine)

Veritas ITMED Center for Medical Technology Transfer (Kyiv, Ukraine)

Clinic of Vascular Innovations (Kyiv, Ukraine)

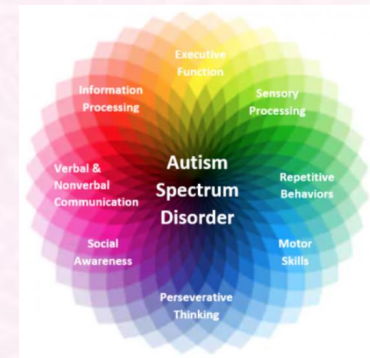
Ukrainian Medical Innovations Medical Center (Ternopil, Ukraine)



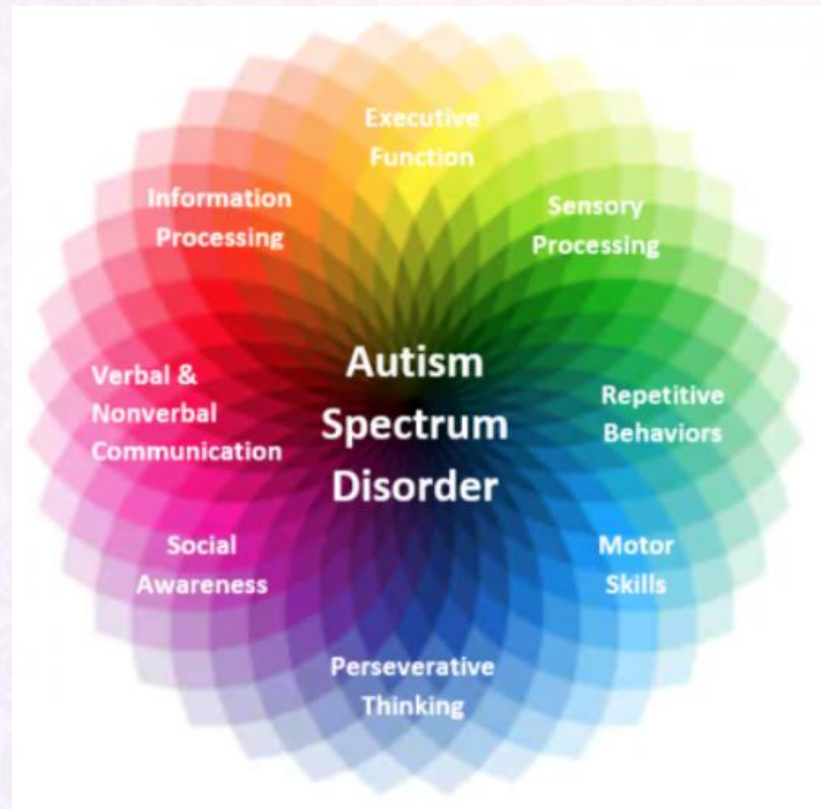
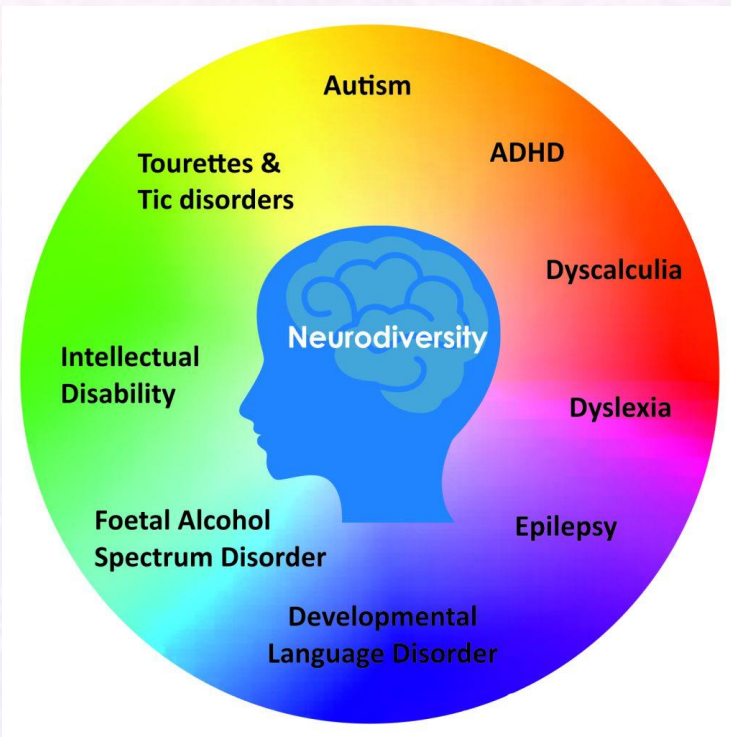
The use of ultrasound cerebral angiography in the assessment of the risks of local reduction of brain perfusion in patients with autistic disorders

Autism often co-occurs with other neuro-developmental differences including;

- Attention Deficit Hyperactivity Disorder (ADHD)
- Developmental Co-ordination Disorder (DCD) also referred to as Dyspraxia
- Developmental Language Disorder (DLD)
- Epilepsy
- Foetal Alcohol Spectrum Disorder
- Intellectual Disability
- Tourettes and Tic disorders
- Specific Learning Disorder/ Differences e.g Dyslexia, Dyscalculia

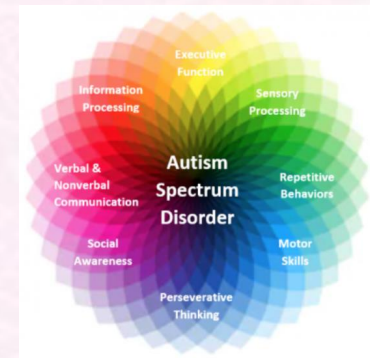


Autism Spectrum Disorder (ASD) is defined as a neurodevelopmental disability causing difficulty with social communication and interaction with other people, as well as, restricted interests and repetitive behaviors (American Psychiatric Association, 2013)



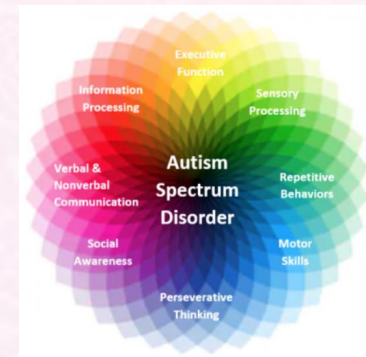
<https://carmenbpingree.com/blog/what-is-autism-spectrum-disorder/>
<https://www.autismtoolbox.co.uk/understanding-autism/what-is-autism/>

Up-to-date ultrasound of the brain structure and assessment of the structure of cerebral angioarchitectonics and the state of local blood supply at different levels of the brain.



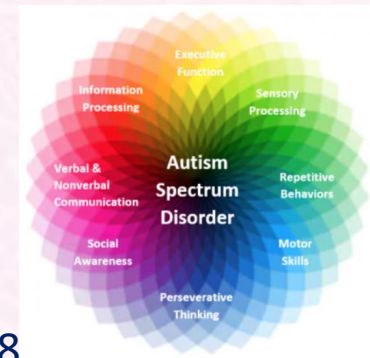
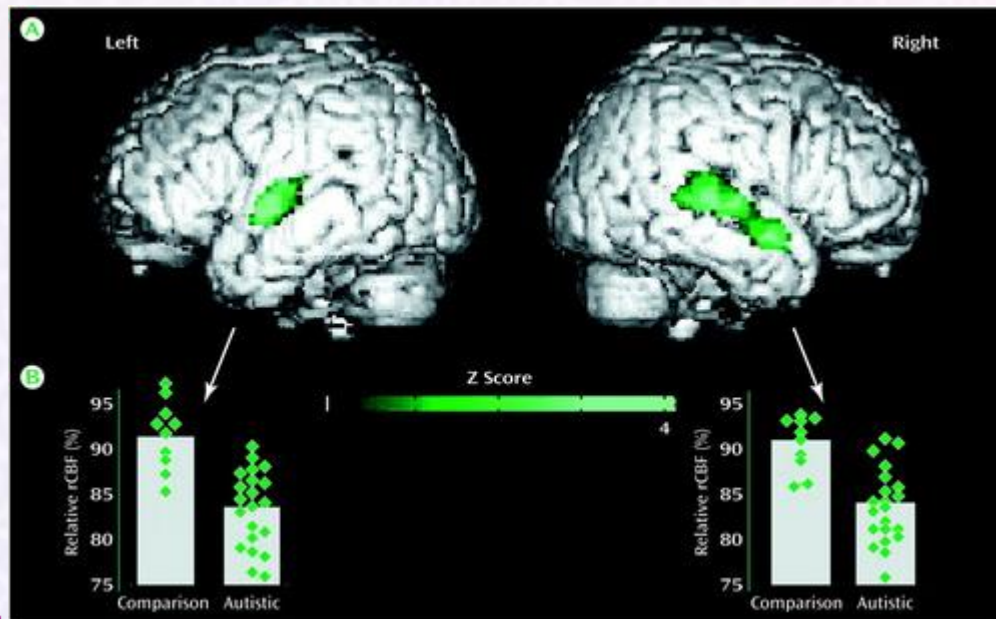
Results

We have examined the structural and functional state of cerebral blood supply in 458 children with clinical signs of autistic reactions and autism aged 2-16 years during 1998-2023.



Results

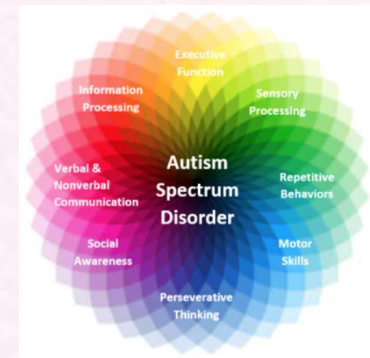
All of them had an **expressed deficiency of blood filling and perfusion in the projection of the posterior cerebral artery and middle cerebral artery, critical cortical deficit in the temporal regions of the brain,** which led to the clinical picture of early childhood asocialization, communication disorders, motor automatisms, and concomitant delays in psycho-speech and behavioural development.



Results

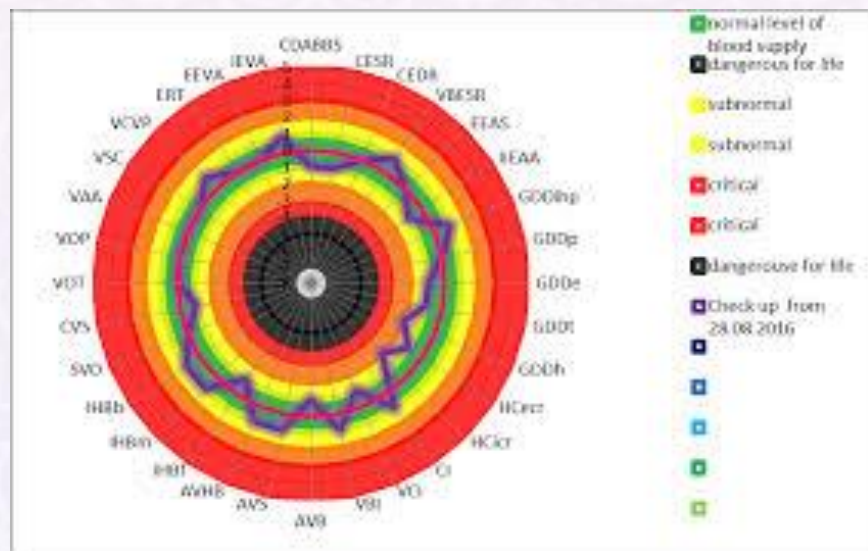
142 of them received treatment for identified disorders of cerebral blood supply under the control of brain ultrasound-angiomarker technology, with the determination of

- hemodynamically marked deviations in the arteriovenous balance of cerebral blood supply,
- a critical level of hydrohemodynamic conflict in posterior cerebral fossa and middle cerebral fossa.
- About 20 different hemodynamic matrices of arteriovenous imbalance in patients with autistic disorders have been established, which requires an individual approach to the formation of Angiocorrection and Angiotherapy.

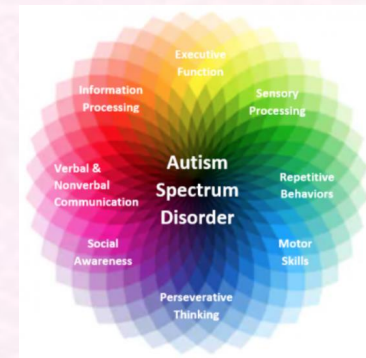
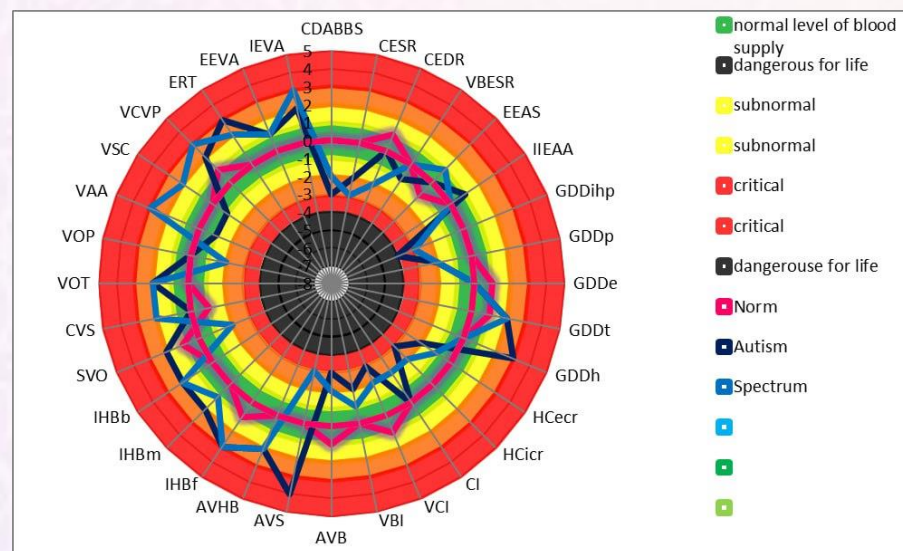


Angiomarkers in children with autism and the autistic spectrum of personality development

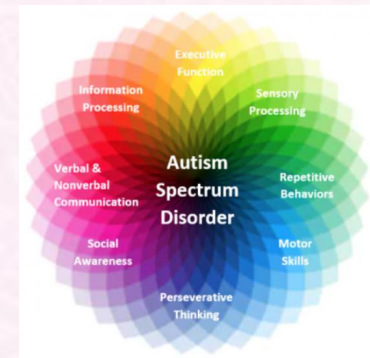
The Norm



Autism Spectrum Disorder (ASD)

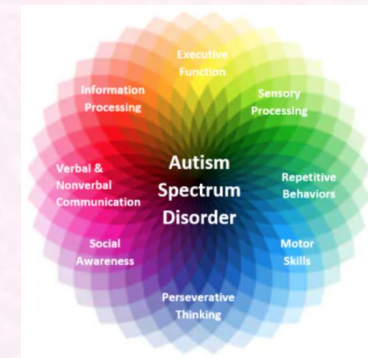
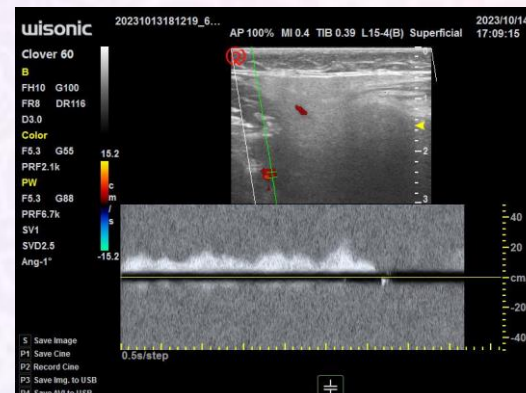
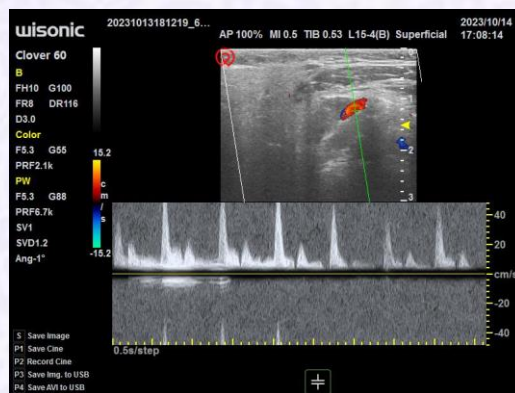
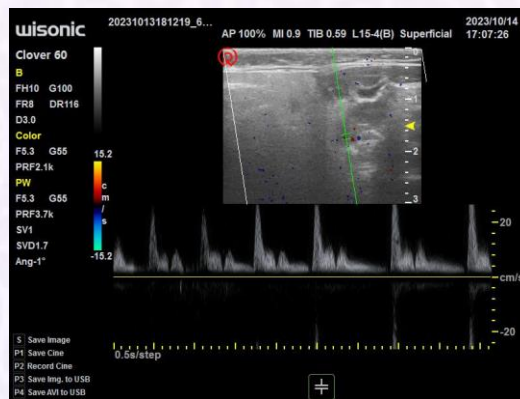


The technology of ultrasound assessment of the dysfunction of the urinary system for the correction of the function of the pelvic organs and the formation of adequate physiological mechanisms for controlling urination and defecation has also been developed.



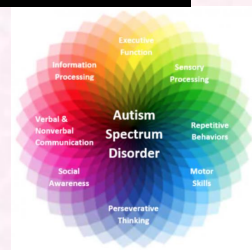
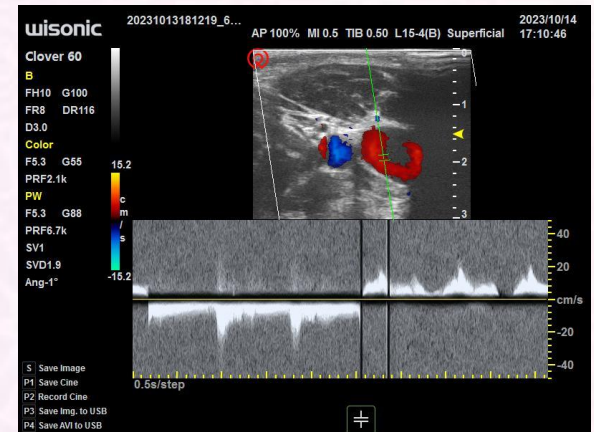
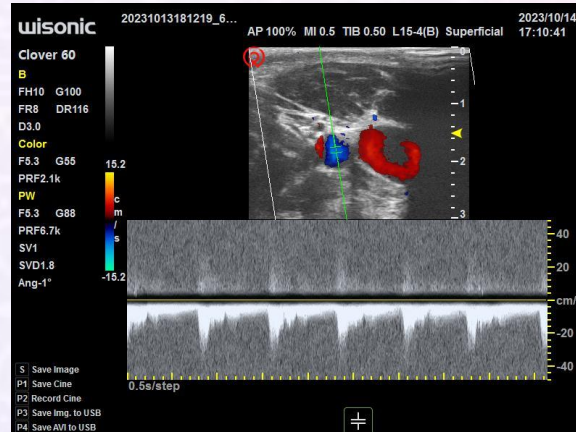
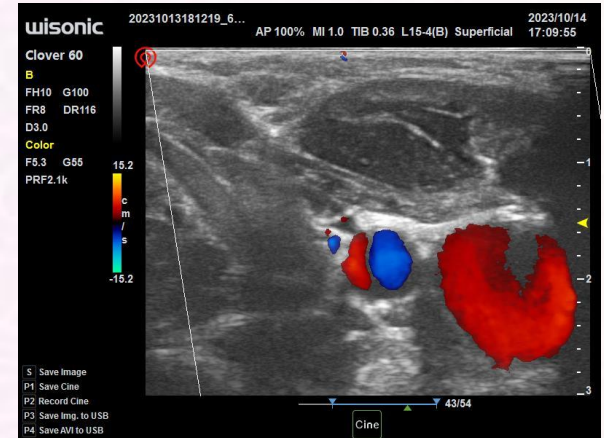
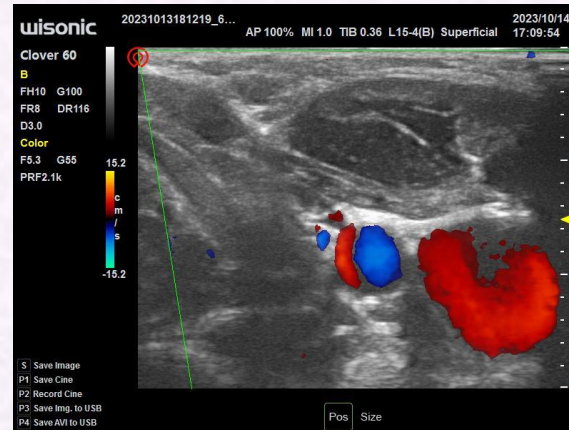
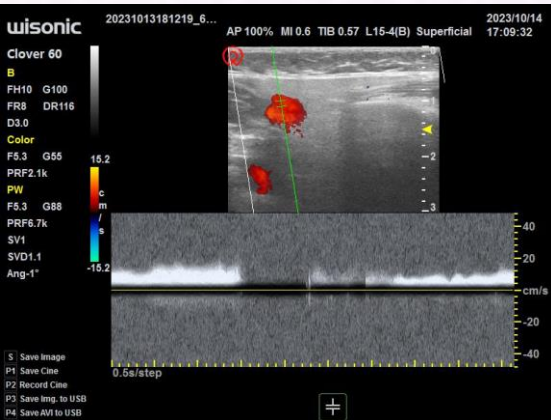
Patient M., 14 y. Children's autism, delay in mental-speech and behavioral development.

Mother's complaints about delayed mental-speech development (emotionally colored sounds, sometimes syllables), lack of interest in learning, behavioral problems, dysfunction of the pelvic organs, enuresis at night, motor automatisms in the hands, fear of new things, etc.



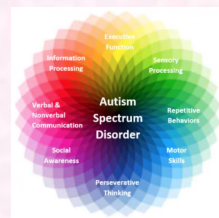
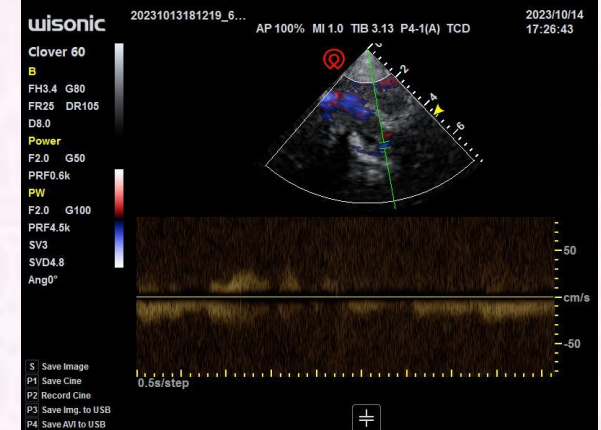
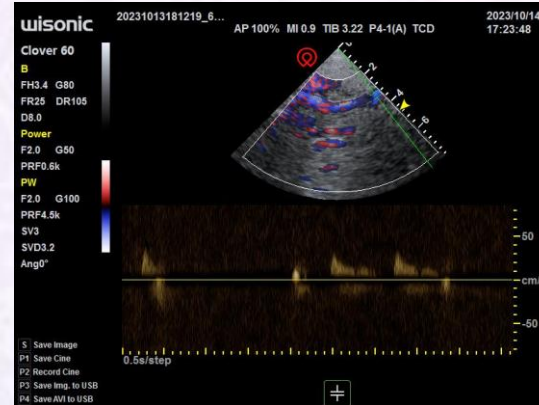
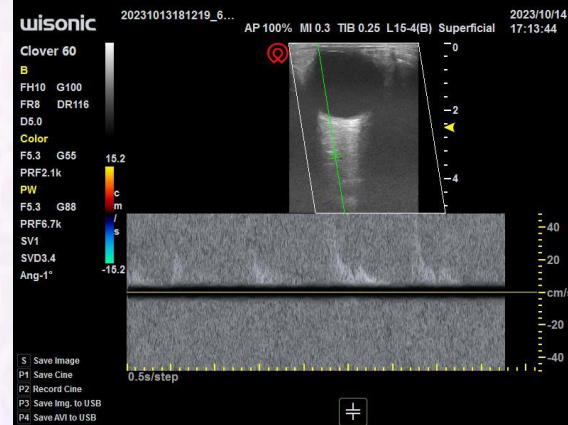
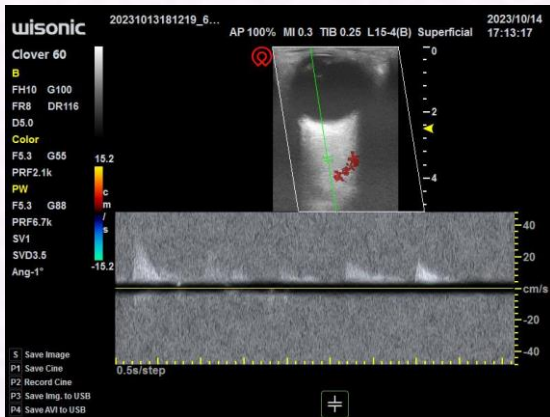
Results

Patient M., 14 years



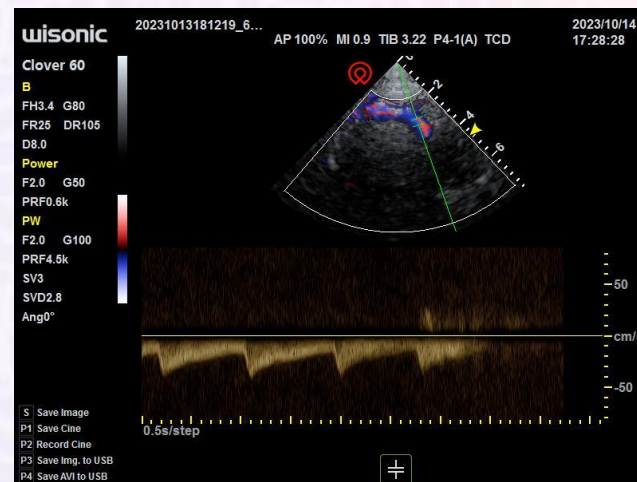
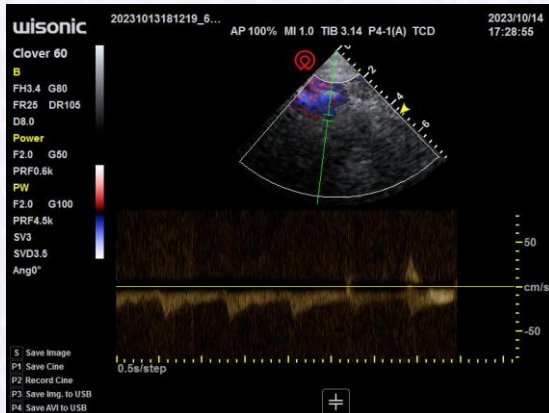
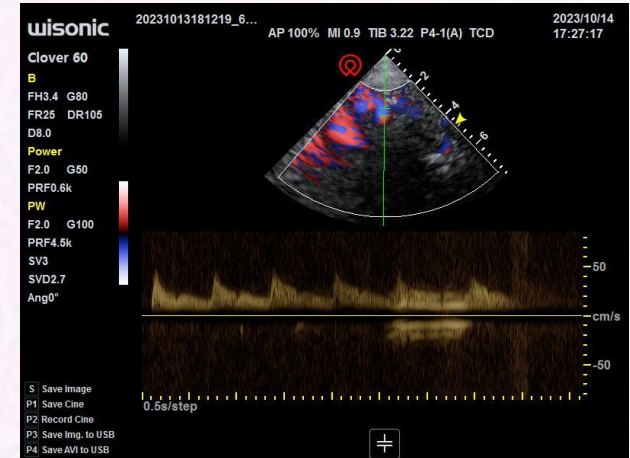
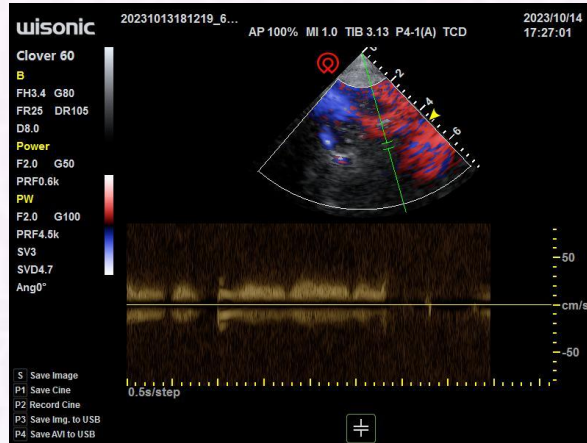
Results

Patient M., 14 years

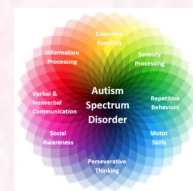
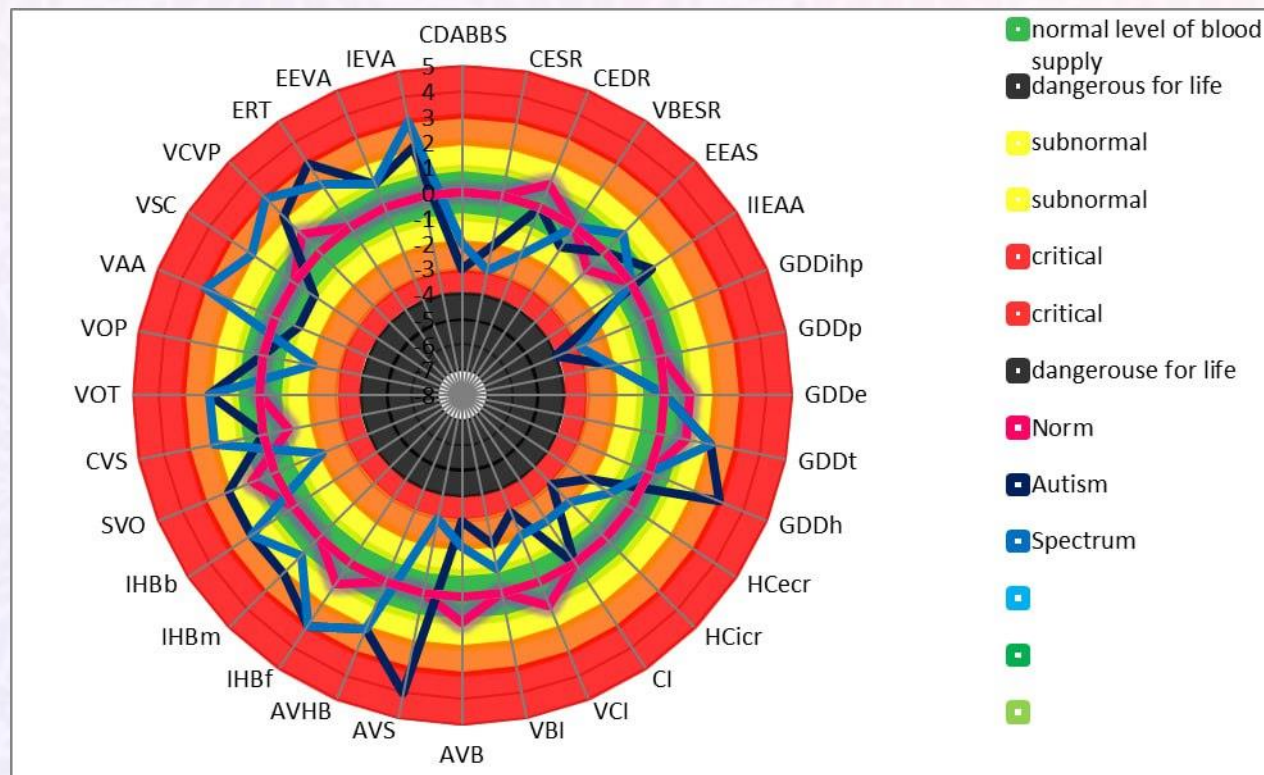


Results

Patient M., 14 years

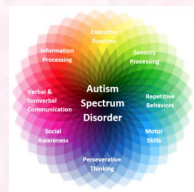
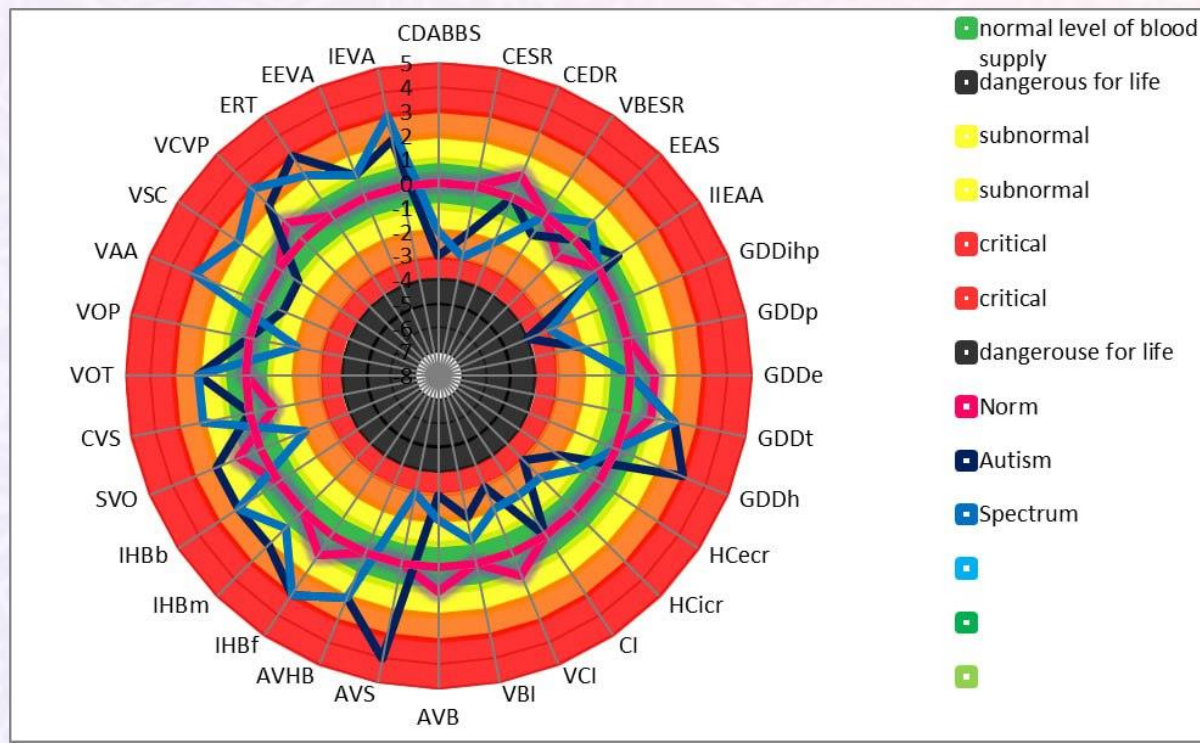


Angiomarkers: expressed deficiency of blood supply in main arteries of the head and neck, critically reduced level of cortical blood supply. Consciousness is maintained at the expense of VBB. The general level of cerebral blood supply is not higher than 30-40% of the systolic phase of blood flow, numerous patterns of pathological arteriovenous shunting.



Results

Angiomarkers: the main artery is within 50% of the age norm. The basis of the pattern is atrial angiospasm, venous dystonia of a moderately hypertensive type. Sharp instability of blood supply in ACA - deficit of 80%, MCA - deficit of 50-60%, PCA - deficit of 50-70%. Numerous pathological AVS in the projection of the MCA and the main artery, the direct sinus is congested. The reserve capabilities of the collateral venous bed are partially included, but do not compensate for the pathological arteriovenous imbalance and the side of venous hypertension.

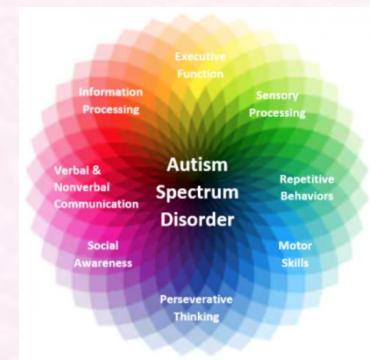


Results

Patient Ish., 7 years

Diagnosis: arrest of mental-speech development.

According to his relatives, the arrest in development started after 1.5-2 years of age in the form of a stop in psychological development, attacks of aggression, hitting, biting, pinching the people around him, selectiveness in food - he only eats bread, milk and macaroni. He tells only words 'mom' and 'dad'. There is no fear of self-preservation and safety of life.



Results

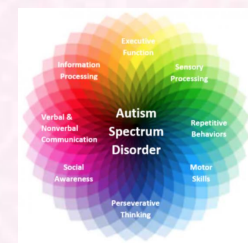
The beginning of treatment. 06/14/2022

Clinical and analytical assessment of brain vessels by ultrasound:

At the time of the examination, visualization of cerebral arteries is sharply limited - according to the dot-segment type. The formation of the brain arteries is correct.

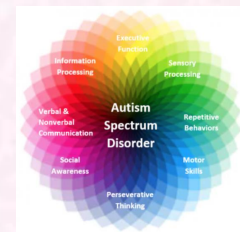
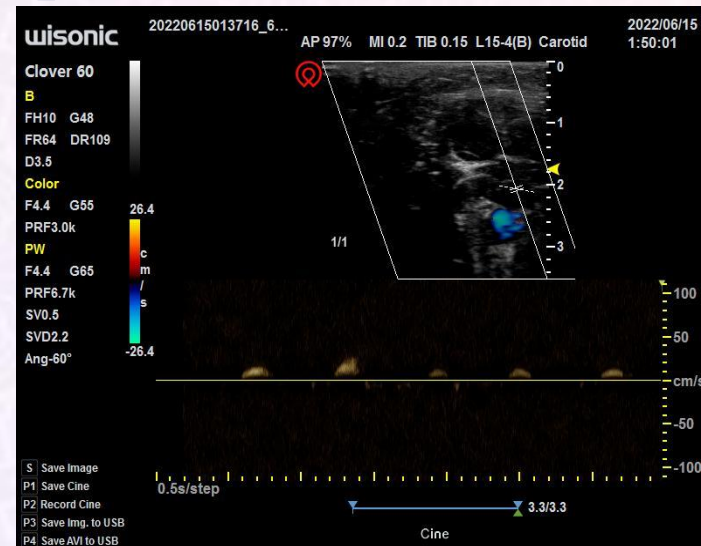
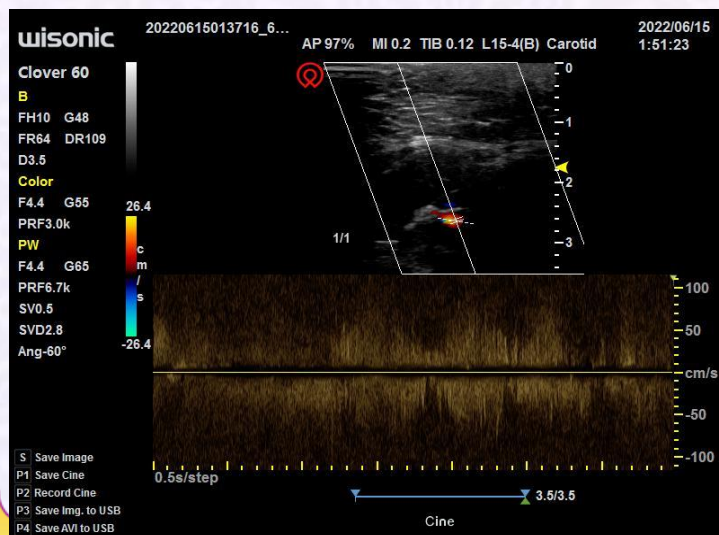
The deficit of cerebral blood flow in the main arteries of the Circle of Willis is within 50%, the blood flow is continuous.

The problems of blood supply to the zone of the frontal regions with sharply limited blood flow in the projection of the ACA and orbital arteries on the background of ventriculodilation of the lateral ventricles (on the left, the width of the lateral ventricle is increased by 20%, on the right - by 10%), subdecompensated intracranial hypertension in the ACF, which contributes to the progression of deviant behavior.



The blood flow in the MCA is sharply unstable with 30-80% systolic and 100% diastolic blood flow with patterns of ischemia in the temporal cortex, which forms a picture of sensorimotor alalia.

Blood flow in the vertebrobasilar region is sharply reduced in the precranial segments on the background of general cardiovascular disorder with preserved autoregulation of blood flow in the projection of the basilar artery and a deficit of 50% systolic and 100% diastolic blood flow in the projection of both PCAs.



Results

In general, blood flow in the main arteries of the neck is sharply unstable with 20-60% systolic and 60-100% diastolic blood flow.

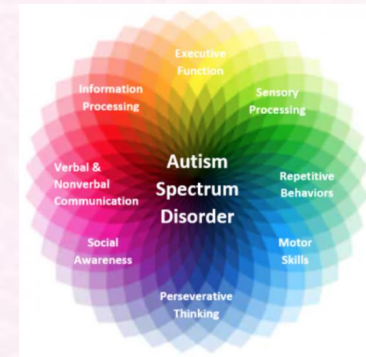
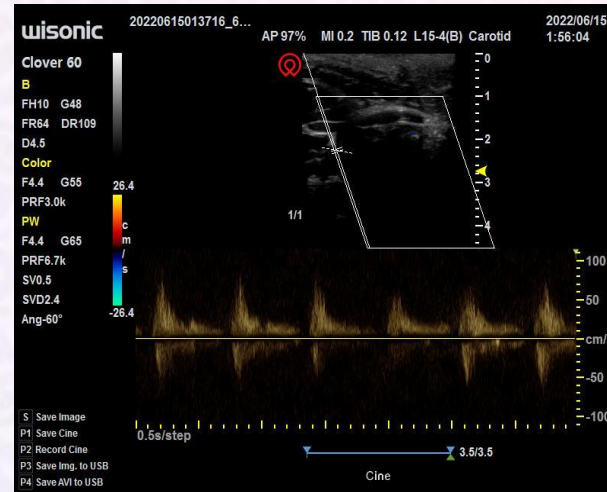
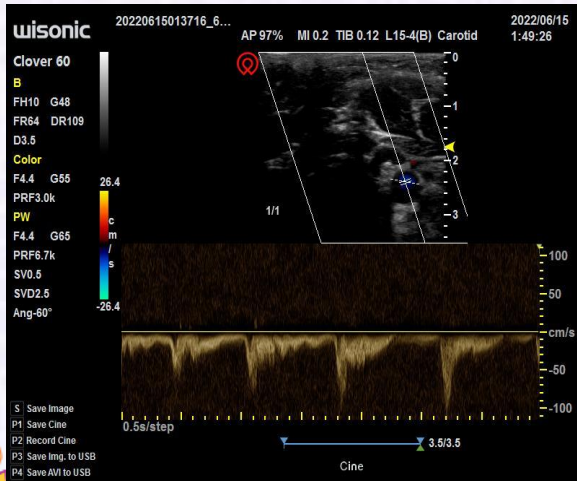
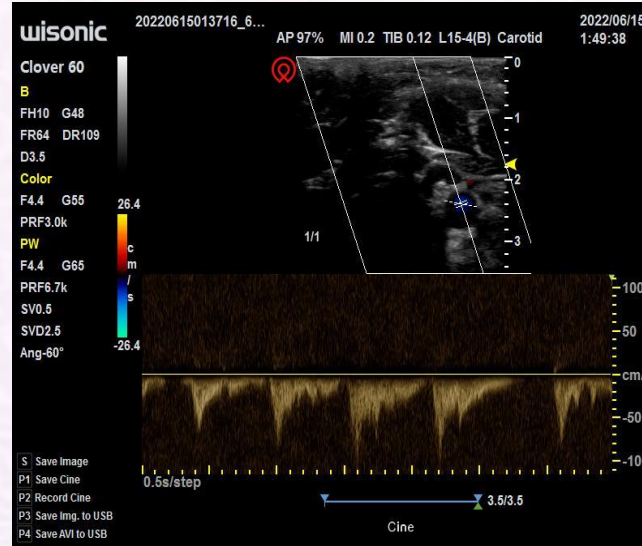
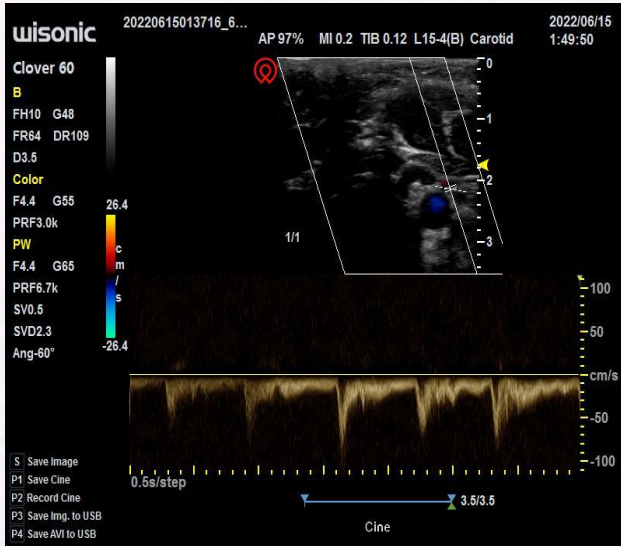
The regional cerebral reservoir is supplied with blood at a total level of 50% of the required level, instability of hemodynamic parameters deepens the deficit of cerebral blood supply by another 30-35%.

The venous outflow is pathologically disturbed, asymmetrical - on the left of the sharply reduced obstructed type, on the right - by the expressed hypertensive type, the straight sinus is moderately overloaded.

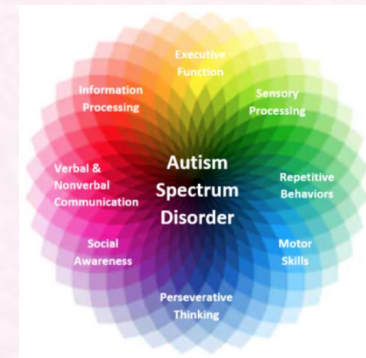
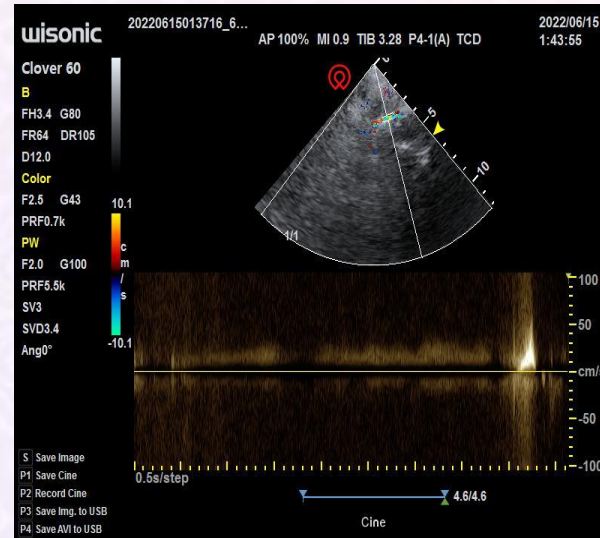
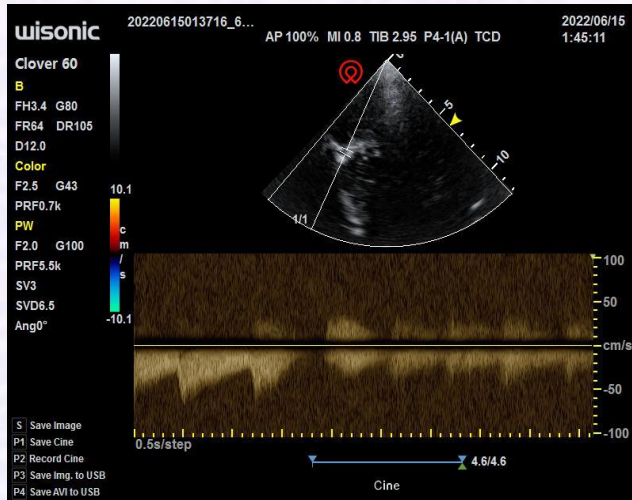
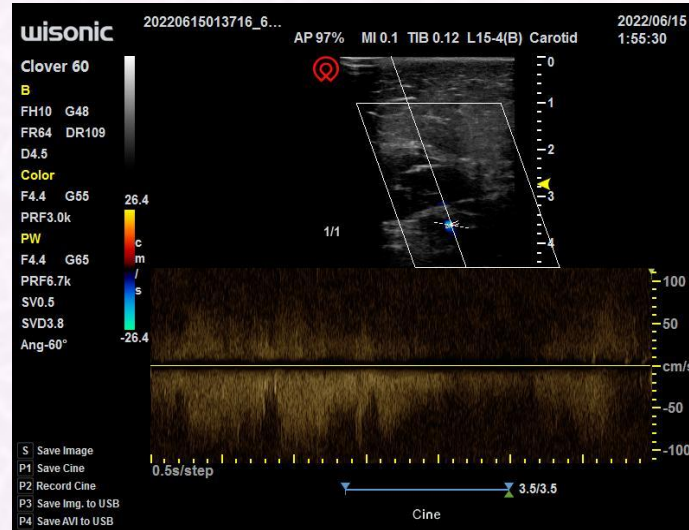
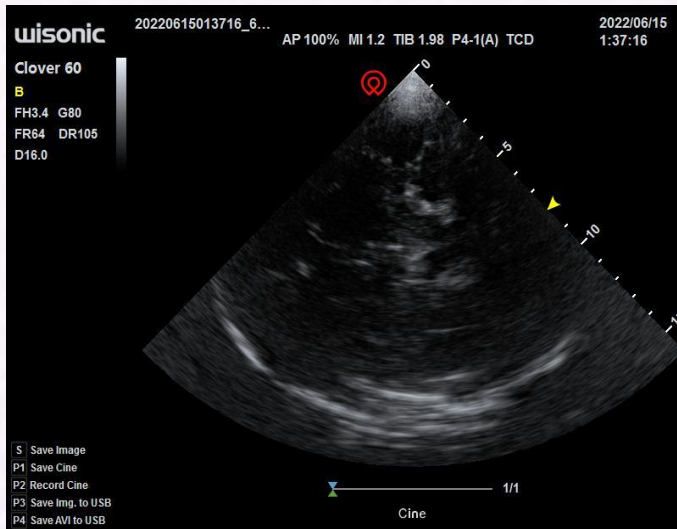
There is no data of the pathological arteriovenous shunting due to severe chronic cerebral edema and pathologically expressed cerebral ischemia on the background of arteriovenous imbalance.



Results

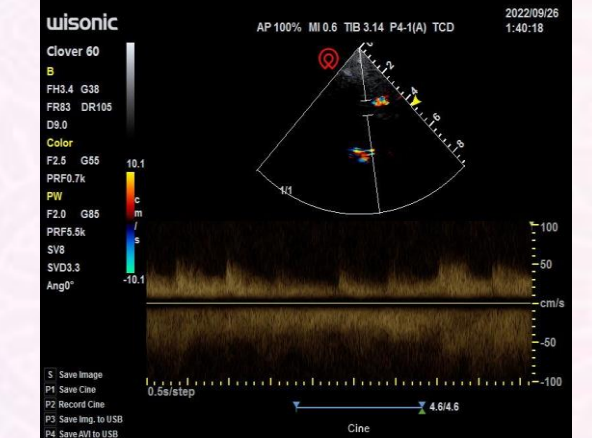
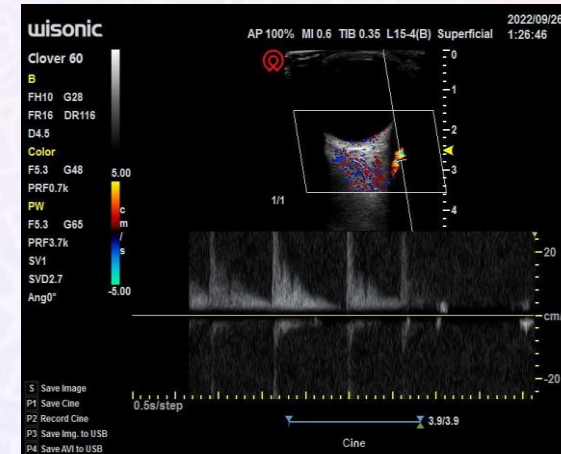
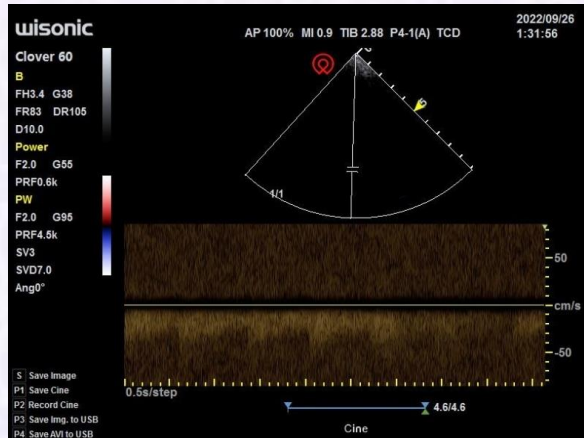
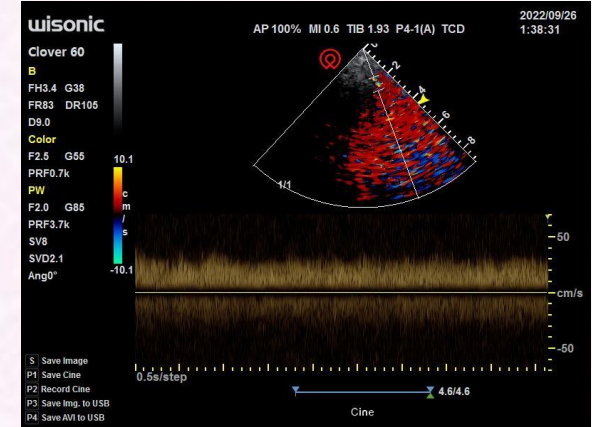
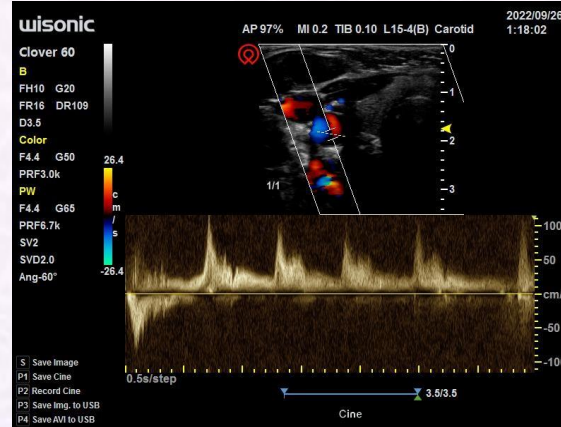
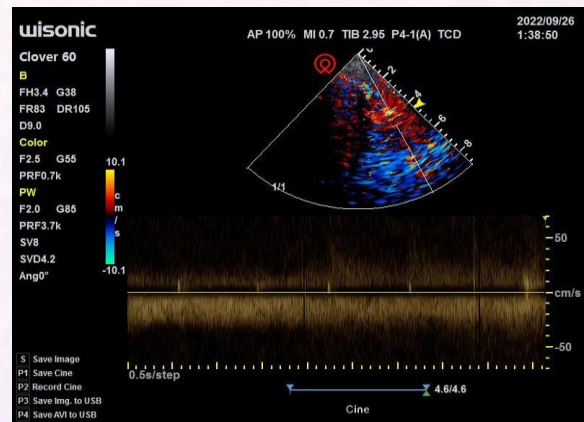


Results



Results

Patient Ish. 13-25/09/23

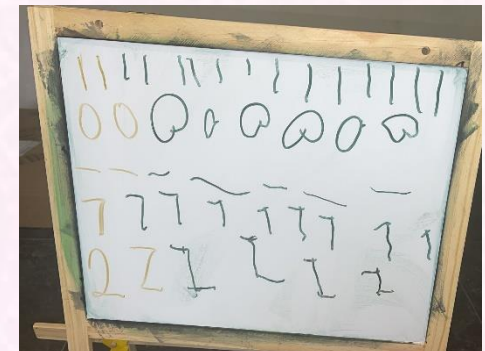
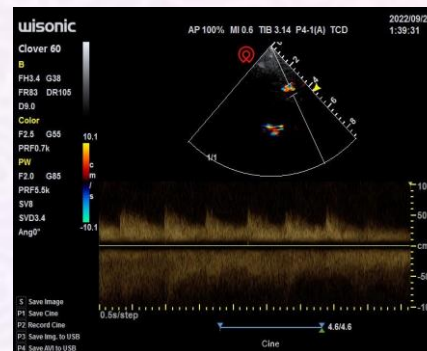
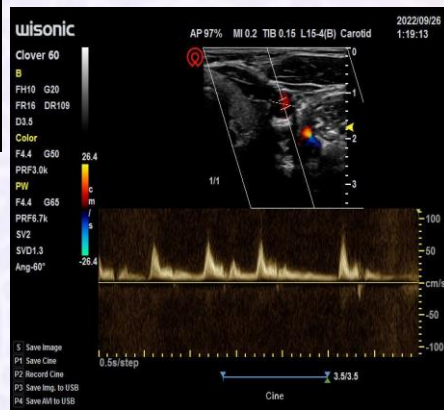
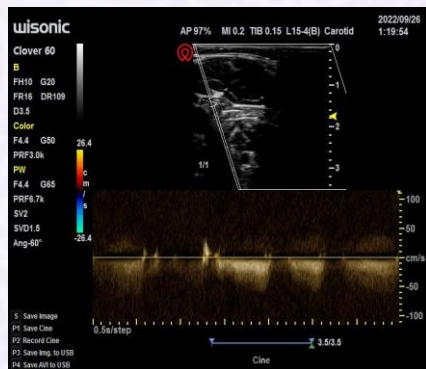


Patient Ish. 13-25/09/23

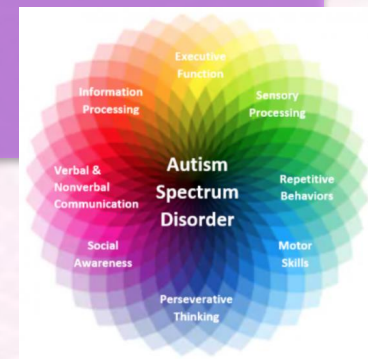
In the dynamics of the treatment course and personalized neurorehabilitation, it was succeeded to improve arterial blood flow in the projection of the carotid system in the precranial and intracranial arteries of the brain.

ICA siphon on the right - 120% of the norm, on the left - 80-90% of the norm.

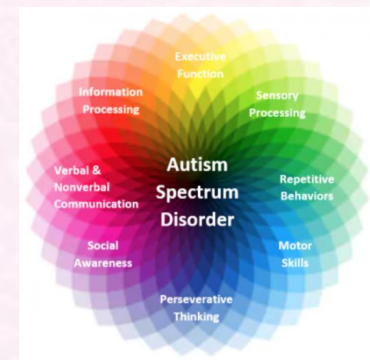
It was succeeded to relieve vasospasm of the left MCA and increase blood flow to 50% with a tendency to be continuous. However, as a stage of arterial launching, a pathological arteriovenous shunting was activated in the projection of the left MCA, which requires further correction.



Ultrasound methodology needs to be improved and implemented in psychiatric and neurological practice to identify the hemodynamic mechanisms of rapidly progressive regression of psychoneurological development in children 2-4 years old, the appearance of motor automatisms, and the formation of clinical and analytical technologies for the objectification and correlation of psychoneurological deficits with various patterns of cerebral dyschemia.



Ultrasound methodology allows not only to verify the fact of cerebral dyshemia, but also to choose individually oriented Angiotherapy in order to minimize cognitive deficits.





Thank you for your attention!

Angio  Smart



www.angio-veritas.com/en/

+38 (093) 135 61 87

(WhatsApp, Viber, Telegram)

Veritasangio@gmail.com

