The 5th WFNS Spine Committee Biennial Conference in conjunction with
The 22nd Annual Scientific Meeting of Indonesian Neurosurgical Society (INS)
The 12th Asian Epilepsy Surgery Congress (AESC) and
The 2nd International Fujita Bantane Interim Meeting of Neurosurgery
Abstract Book of The 5th WFNS Spine Committee Biennial Conference in conjunction with
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“Meeting the Challenges, Facing the Future”
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Dear Friends,

It is our great pleasure to invite you to The 5th WFNS Spine Committee Biennial Conference of WFNS which will be held at Bali, Indonesia between October 25th - 27th, 2018.

WFNS scientific committees try to contribute to the education and progress of sub disciplines of neurosurgery. Spine surgery is getting a high interest and Spine Committee Symposia every two years are the largest activity of the committee. I am happy to invite you to Bali, Indonesia to endorse activities in this part of the world. This meeting will be in conjunction with the Annual Meeting of Indonesian Neurological Society, Asian Epilepsy Surgery Congress.

On October 25, a one-day cadaver dissection course will be held in Surabaya. The meeting aims to reach a large number of audience, thus contribute to the spine education in this area more effectively. There will be "intense", and full of excellent lectures from prominent experts, results of implementation of new procedures, case discussions, debate sessions, video demonstrations, and workshops from industry.

The location of our congress is Bali island, one of the most beautiful and exotic place of the world. We really hope that it will endow us with many precious and long-lasting memories to cherish.

We look forward to seeing you in Bali in October 2018.

Co-chairman of the WFNS Spine Committee.

Mehmet Zileli   Michael G.Fehlings            Daniel J.Hoh
OP 076

OUR EXPERIENCE IN SURGICAL TREATMENT OF ARNOLD CHIARI MALFORMATION TYPE 1

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Introduction: There are four types of Arnold Chiari Malformation type 1 described in the literature. Due to the fact that it is a common finding in the general population (true Chiari being present in 0.75% of the population), Arnold Chiari Malformation type 1 was also called Chiari anomaly.

Material and methods: In the last 7 years 9 patients with Arnold Chiari Malformation type 1 have been treated in our institution. There were 6 women and 3 men. The mean age was 36.3 years (between 19 and 58 years).

Surgical treatment: According to recent literature patients respond best when operated within 2 years from the onset of symptoms. We recommend early surgery for symptomatic patients. Surgical treatment of Chiari I malformation should accomplish several goals. First of all, there is the obvious need to decompress the lower part of the cerebellum. Chiari I malformation being related to a small posterior fossa, the surgical treatment should realise enlargement of the total volume of the posterior fossa. The approaches were used in the last seven years in our institution for the treatment of symptomatic patients is osseous decompression with dural grafting and intradural dissection of adhesions in all patients.

Results: The long-term (6 months postoperative) surgery-related result was considered excellent if symptoms resolved. The result was considered good if the patient experienced significant improvement but also residual symptoms (8 patients). A poor result indicated no change in symptoms (1 patient).

Conclusions: Regarding Chiari I malformations, the author considers that a proper patient selection is critical to prevent unnecessary procedures and maximize the outcome. In light of this study results and recent literature, the author considers that the surgical gold standard consists in three key steps: posterior fossa craniectomy followed by durotomy and subarachnoid decompression of CSF flow and last duroplasty.

Key words: small posterior fossa, osseous decompression, dural graft, syringomyelia

OP 077

A CASE SERIES OF HYDROCEPHALUS AS CLINICAL INDICATOR OF CENTRAL NERVOUS SYSTEM RELAPSE IN ACUTE LYMPHOBLASTIC LEUKEMIA IN RSUP DR. SARDJITO

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Background: Hydrocephalus is one of clinical problem found in pediatric neurosurgical RSUP dr. Sardjito. This condition involves dilatation of cerebral ventricular system due to various etiologies. It is classified into two conditions, communicative and obstruction type. Various etiologies cause different clinical features and need different modality of treatments. Acute lymphoblastic leukemia (ALL) is the most common cancer diagnosis in children. While current treatment has greatly improved survival rates, relapse occurs in 15-20% of patients. Signs and symptoms are similar to those found at initial presentation. However, in some patients, relapse can occur in the central nervous system (CNS), even if they did not have previous CNS involvement. Many cases of CNS relapse are clinically silent and are discovered at the time of bone marrow relapse. These patients can be asymptomatic or show signs of mass effect or increased intracranial pressure. Classic Head CT Scan findings dilatation of cerebral ventricular system. In this case report, we describe a child with lymphoblast in ALL with CNS involvement.

Methods: Patients younger than 10 years diagnosed with ALL and hydrocephalus. Three cases were confirmed based on histopathology of Bone Marrow Puncture (BMP). Laboratory studies, initial pathology, and imaging were abstracted.

Results: on progress

Conclusions: on progress

Keywords: Hydrocephalus, ALL, childhood cancer.
Our experience in surgical treatment of Chiari Type 1 Malformations

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Abstract

Introduction:
There are four types of Arnold Chiari Malformation type 1 described in the literature. Due to the fact that it is a common finding in the general population (true Chiari being present in 0.75% of the population), Arnold Chiari Malformation type 1 was also called Chiari anomaly.

Material and methods:
In the last 7 years 9 patients with Arnold Chiari Malformation type 1 have been treated in our institution. There were 6 women and 3 men. The mean age was 36.3 years (between 19 and 58 years). The symptoms were grouped in 5 syndromes: brain stem and bulbar palsy syndrome, cerebellar syndrome, central cord syndrome, paroxysmal intracranial hypertension, pyramidal syndrome.

Surgical treatment:
According to recent literature patients respond best when operated within 2 years from the onset of symptoms. We recommend early surgery for symptomatic patients. Surgical treatment of Chiari I malformation should accomplish several golds. First of all, there is the obvious need to decompress the lower part of the cerebellum. Chiari I malformation being related to a small posterior fossa, the surgical treatment should realise enlargement of the total volume of the posterior fossa. In the author’s opinion the key point in surgical treatment of Chiari I malformation should be to reestablish the CSF flow at the level of the foramen of Magendie and foramen magnum. The
approaches were used in the last seven years in our Institution for the treatment of symptomatic patients is osseous decompression with dural grafting and intradural dissection of adhesions in all patients.

**Results:**
The long-term (6 months postoperative) surgery-related result was considered excellent if symptoms resolved (0 patients). The result was considered good if the patient experienced significant improvement but also residual symptoms (8 patients). A poor result indicated no change in symptoms (1 patients).

**Conclusions:**
Regarding Chiari I malformations, the author considers that a proper patient selection is critical to prevent unnecessary procedures and maximize the outcome. In light of this study results and recent literature, the author considers that the surgical gold standard consists in three key steps: posterior fossa craniectomy followed by durotomy and subarachnoid decompression of CSF flow and last duroplasty.

**Key words:** small posterior fossa, osseous decompression, dural graft, syringomyelia
Introduction

Arnold Chiari malformations (ACM) are named for Hans Chiari, an Austrian pathologist, who first identified type I-III in 1891. Ulius Arnold further expanded the definition of Chiari malformation type II and some medical sources began using the name Arnold-Chiari malformation.¹·²·³ There are four types of Chiari malformations described in the literature. :

Type 1- Refers to herniation of cerebellar tonsils alone, radiologically as simple tonsilar herniation 5 mm or greater, below the foramen magnum.

Type 2- Herniation of both cerebellum and lower brain stem with spina bifida.

Type 3- Rare type of brain herniation in association with cervical or occipital encephalocoele.

Type 4- Extreme cerebellar hypoplasia and caudal displacement of posterior cranial fossa contents.⁴

Tubbs et al described two additional type of chiari malformation Chiari type 0- Syringohydromyelia with distortion of contents in posterior fossa but without cerebellar tonsillar herniation Chiari type 1. Caudal migration of brainstem and cerebellar tonsils often associated with syringomyelia ⁵

ACM Type 1 is a congenital malformation, generally asymptomatic during childhood, often manifests with headaches and cerebellar symptoms herniation of cerebellar tonsils in MRI scan of cervical spine.¹·² Symptoms are headaches aggravated by valsalva manoeuvres such as yawning, laughing, crying, coughing, sneezing or straining, tinnitus, dizziness, vertigo, nausea, nystagmus, facial pain, muscle weakness, impaired gag reflex, restless leg syndrome, sleep apnoea, dysphagia, impaired coordination, pupillary dilatation, dysautonomia, tachycardia, syncope and chronic fatigue. The blockage of Cerebro-Spinal Fluid (CSF) flow may also cause a syrinx to form, eventually leading to Syringomyelia. Central cord symptoms such as hand weakness, dissociated sensory loss, and, in severe cases, paralysis may occur.
ACM type 1 are perhaps one of the most controversial topics in neurosurgery today. There is a lack of agreement as to what defines these malformations, their symptoms and their natural history. If treatment is necessary, a wide variety of techniques have been proposed.⁶,⁷

The purpose of the present study is to retrospectively review a seven years experience in 9 patients consecutively treated for syringomyelia with ACM type 1 in one institution. All patients of the series underwent FMD as a basic procedure either alone or combined with additional manipulations.

**Epidemiology**

There are no population-based studies on the incidence or prevalence of Chiari malformations. From clinical series, prevalence has been estimated between 0.1 and 0.5% ⁸ but it is possible that higher rates could have resulted from more widespread recent use of MRI. Another study estimated a prevalence of 0.77% based on the total population of patients undergoing MRI of the head at a tertiary care center over a period of 3.5 years. Of these patients, 14% were clinically asymptomatic.⁹ Estimates suggest that approximately 215,000 Americans may be affected with Chiari malformations, with or without syringomyelia. The incidence of Chiari malformations ranges between 1/18,000 and 1/1280, not correcting for the suspected underdiagnosis of asymptomatic patients due to a lack universal neuroimaging. An estimated 65%–80% of patients with Chiari malformations present with syringomyelia.¹⁰
Patients and Methods

Material and methods

Our Experience

In the last seven years nine patients with Arnold Chiari Malformation type 1 have been treated in our Institution.

Population Characteristics
The mean age of the patients was 36 years (between 19 and 58 years). There were 6 female (66.6%) and 3 male (33.3%) patients.

Clinical Presentation:
Sensory disturbances were present in the upper limbs in 70.6% and in the lower limbs in 29.3% of patients. Motor weakness was present in the upper limbs in 65.3% and in the lower limbs in 61.3% of patients. Headaches were noted in 21%, neck pain or stiffness in 36%, lower cranial nerves palsy in 25% and nystagmus in 8%.

The symptoms were grouped in 5 syndromes:
1. Brain stem and bulbar palsy syndrome: caused by brainstem compression or syringobulbia, including variable involvement of the cranial nerves, lower brain stem. Symptoms include tinnitus (2 patients), headache (9 patients), neck pain (6 patients).
2. Cerebellar syndrome: Ataxia of the limbs or trunk (3 patients), dizziness (6 patients) and dysarthria (3 patients), Diasdokinesia (3 patients).
3. Central cord syndrome: caused by canal compression or syringomyelia, including pain (frequently “burning”) (3 patients), dissociated and posterior column sensory loss (9 patients).
4. Paroxysmal intracranial hypertension: exertional headache and nausea, vomiting, and dizziness associated with a headache episode all patients.
5. Pyramidal syndrome: stiffness and/or spasticity and hyperreflexia (3 patients), motor weakness and variable long tract signs (9 patients), atrophy (9 patients).

MRI Evaluation
Magnetic resonance imaging of the cranio-spinal junction represents the gold standard diagnostic tool. A descend of tonsils of 5 mm or more below the foramen magnum is considered a pathological tonsilar ectopia, but this is still under debate.¹¹

![Sagittal T1-weighted MR image of the brain showing herniation of cerebellar tonsils and a low-lying obex characteristic of Chiari malformation Type I.](image)

**Figure 1.** Sagittal T1-weighted MR image of the brain showing herniation of cerebellar tonsils and a low-lying obex characteristic of Chiari malformation Type I.

CASE
Most of patient was applied to hospital with Headache, sensory loss of left/ right upper extremity and cape sensory loss. Patients mentioned this condition evolved in the last 2-20 years. The patients reported received a treatment for her/his complaints, But patient also reported had not seen any benefit from treatment and had not applied to hospital until she/he got worsen. On physical examination, vital signs were within normal range, In neurological examination, positive rowsing test and hypoesthesia of right upper extremity was noticed, patient was not able to walk on a straight line and not able to make sequential movements. Patient’s complete blood count and biochemical tests were normal. However, no pathological finding was observed in this test. Cranial and cervical Magnetic Resonance Imaging (MRI) was performed due to findings of
neurological examination. In MRI, cerebellar tonsils were found to be protruded (herniated) caudally through the foramen magnum and mild brain stem compression was observed. Patient was diagnosed as Arnold Chiari Malformation type 1 due to existing complaints, physical examination and cervical magnetic resonance imaging findings.

**Case Report**

**Case history**

The procedure done was Posterior foramen magnum decompression, C-1 Laminectomy and duraplasty.

**Indications for Surgery**

According to recent literature patients respond best when operated within 2 years from the onset of symptoms. We recommend early surgery for symptomatic patients. There are several strong indications for posterior fossa decompression such as drop attacks, dysphagia with aspiration, apnea and the presence of syrinx. Headache represents a controversial indication for surgery when it is the only symptom.¹²,¹³

**Objectives of surgery**

In the author’s opinion, surgical treatment of Chiari I malformation should accomplish several golds. First of all, there is the obvious need to decompress the lower part of the cerebellum. Chiari I malformation being related to a small posterior fossa, the surgical treatment should realise enlargement of the total volume of the posterior fossa.⁷,¹² In the author’s opinion the key point in surgery treatment of Chiari 1 malformation should be to reestablish the CSF flow at the level of the foramen of Magendie and foramen magnum. Although numerous techniques of surgery have been proposed since Chiari first described the patology, all of them have been reported with advantages and
disadvantages, and none of them managed to fully accomplish the desired goals of surgery.

**Techniques of surgery**

One approaches have been used for all the treatment of symptomatic patients in our Institution in the last seven years: we use only osseus decompression with dural grafting in all patients; We perform a more aggressive decompression and intradural dissection when a syrinx is present.

**I. Osseus decompression (cranio-vertebral decompression/ laminectomy)**

First of all, the craniectomy should not be larger than 3x3 cm in order to avoid cerebellar sag.¹⁴ The author recommends C1 laminectomy in most cases, but extension to C2 laminectomy is also possible this being directly related to caudal displacement of the cerebellar tonsils.

**II. Opening of the dura + intra-arachnoid dissection**

Opening of the dura and intraarachnoid dissection of the scarring are, our opinion, the essential steps in ACM tipe 1 surgery. we strongly recommends them because osseus decompression only, does not achieve one of the main objectives of surgery, increasing the global volume of the posterior fossa. The dura is opened through a Y shaped incision. The next step is represented by intraarachnoid dissection of the arachnoid scarring, reestablishing the normal CSF flow. Visualization of the choroid plexus of the 4th ventricle and free flow of CSF into the subarachnoid space consist in our opinion the proof of adequate decompression. we prefers not to aggressively resect the herniated tonsils; instead he realises a controlled and intended tonsillar ischaemia with bipolar coagulation of PICA tonsillar branches. We are also tries to maintain the flow of the CSF through the foramen of Magendie, by lateral suspension of the medial part of the tonsill. We are prefers to reserve syringomyelic drainage for patients who fail to respond (clinically, not radiologically) to initial posterior fossa decompression. Avoiding the risks and complications associated with shunting procedures is desirable.
**III. Dural graft**

Duramater being inextensible, the author considers that in order to achieve one of the goals of treatment (enlargement of the posterior fossa), it needs to realise a dural graft. We uses autologous graft – pericranium – in order to achieve a tight closure of the dura without CSF leak. Tight closure of the dura is mandatory in our opinion because it prevents blood leakage from the extradural to the intradural space thus preventing subdural/intraarachnoid scarring. Also, it prevents CSF leakage and pseudomeningocele.¹⁵

**Discussion**

With or without Syringomyelia, due to unspecific clinical findings, definitive diagnosis of symptomatic is often made lately. In the period of time, until correct diagnosis, patients usually get diagnosis of multiple sclerosis, muscular dystrophy or other degenerative diseases, current case was diagnosed as cluster headache and given analgesic treatment. Type I malformation, the most common variant, is often seen in adults and onset of symptoms is seen at range of 25-30 years⁶. Thirty percent of the cases are asymptomatic. Symptoms and signs are seen in a wide spectrum, typically progresses insidiously and slowly, severe neurological deficits can be seen in progression. ACM type 1 is often present a complex clinical presentation. Symptoms are usually seen during early adulthood and occur gradually. Due to dysfunction of cerebellum, brain stem and spinal cord, a highly variable manifestation is seen. Somehow, occasional exacerbations develop in some of the patients. Due to Valsalva maneuver, temporary increase in pressure at the posterior of the brain may lead to headaches. Symptoms and associated clinical findings of spinal cord syndrome depend on location and length of the syringohydromyelia and therefore may vary from patient to patient. The most common symptom is headache felt in the back of the head, but ataxia, dysarthria, dysphagia, neck pain, sensory differences have also been reported. Increased
intracranial pressure caused by tonsillar herniation leads to papilledema. Findings of increased intracranial pressure and papilledema were not seen in this case. In our Institutional case series, surgical treatment of Chiari I malformation consisted of 9 patient The most important question that are mains to be answered is whether good results could be achieved by leaving the arachnoid or dura intact. According to some authors, leaving the dura and the arachnoid intact can result in lower complication rates, but this data is counterbalanced by high rates of recurrence of symptoms and the need for revision surgeries. Also, leaving the dura and the arachnoid intact results in lower rates of syrinx reduction. In our institutional series all patient perform with simple suboccipital craniectomy + duraplasty.

**Results**

Postoperatively, the condition of the patients was reassessed at the follow-up visits (1 month, 3 months, 6 months, 1 year) according to: symptoms resolution; signs and symptoms improvement; signs and symptoms worsening. Those associated with poor outcome include, signs or symptoms suggestive of syringohydromyelia. Weakness in the absence of atrophy tends to respond well, while mild scoliosis, seems to respond reasonably well to surgery Patients with signs of cerebellar syndrome and paroxysmal intracranial hypertension respond best to surgical management, followed by patients with pyramidal and brain stem syndromes. As for the surgery technique used, the vast majority of patients with good or excellent outcome at 6 months underwent osseous decompression with dural grafting.

**Conclusions**

ACM type 1 Diagnosis is made through a combination of patient history, neurological examination, and Magnetic Resonance Imaging (MRI). ACM type 1 is usually presented with many different symptoms when diagnosed in adults. Symptoms of this malformation such as headache, loss of sensation and neck pain are common
complaints. Due to common and unspecific symptoms, ACM Type 1 may be confused easily with other disorders. For this reason detailed examination and skeptical approach is important in differential diagnosis. We think that detailed examination of patients who presented with ongoing or increasing unspecific symptoms over the years, may contribute us to make accurate diagnosis. The author believes that preoperative longtime neurological deficit is a predictor of poorer outcome, making early surgery, mandatory.

The key point of surgery in Chiari I malformation is to allow a CSF flow at the level of foramen of Magendie. In light of this study results and recent literature, the author considers that the surgical gold standard consists of three key steps: posterior fossa craniectomy followed by durotomy and subarachnoid decompression of CSF flow and last, duroplasty.
Figure 2. Our experience in surgical treatment of Chiari Type 1 Malformations with good outcome

The surgeon must identify and decompress all structures potentially restricting CSF flow at the occipitocervical junction including bone, fibrous tension bands, dura, arachnoid adhesions, or the cerebellar tonsils themselves. The goal is restoration of CSF flow and/or reduction in spinal cord syrinx volumes and pressures in most patients. Additionally, a reduction in duration and/or severity of occipital headaches and signs and symptoms of cervicomedullary compression can be expected.
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