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**Sources Searched:** Medline, Embase, PubMed, CINAHL, DynaMed

## Syringomyelia and Pregnancy/Delivery

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### **1. Chiari I malformation and delivery.**

**Author(s):** Bolognese, Paolo A; Kula, Roger W; Onesti, Stephen T

**Source:** Surgical neurology international; 2017; vol. 8 ; p. 12

**Publication Date:** 2017

**Publication Type(s):** Journal Article

Available in full text at [Surgical Neurology International](#) - from Free Access Content

**Database:** Medline

### **2. Management of parturients in active labor with Arnold Chiari malformation, tonsillar herniation, and syringomyelia.**

**Author(s):** Ghaly RF; Tverdohleb T; Candido KD; Knezevic NN

**Source:** Surgical neurology international; 2017; vol. 8 ; p. 10

**Publication Date:** 2017

**Publication Type(s):** Journal Article

**PubMedID:** 28217389

Available in full text at [Surgical Neurology International](#) - from ProQuest

Available in full text at [Surgical Neurology International](#) - from Free Access Content

**Abstract:** BACKGROUND: Arnold-Chiari malformation Type 1 (ACM-1) in parturients is a topic of ongoing discussion between obstetricians and anesthesiologists. The primary unanswered question remains; How should the anesthesia provider proceed with labor analgesia and anesthesia for cesarean section when confronted with an advanced, asymptomatic, or minimally symptomatic case of ACM-1 during labor? CASE DESCRIPTION: A 24-year-old, ASA II, G1P0 full-term parturient presented to Labor and Delivery for vaginal delivery. A diagnosis of ACM-1 was made 12 years ago when a brain magnetic resonance imaging (MRI) was performed for right-sided numbness following a rear-end motor vehicle collision. The patient had been asymptomatic since then and had been seen by an outside neurologist frequently for the past 10 years. During the anesthesia evaluation, it was noted that she had an exaggerated patellar reflex, and a questionable left-sided Babinski; subsequently, an MRI study was requested. Review of a brain MRI demonstrated an advanced form of ACM with a 1.7 cm transtonsillar herniation and a large syrinx extending from C1 down to C5. Following a discussion with the patient, family, and primary OB team, a plan for elective cesarean section was made per neurosurgical recommendations. This was conducted uneventfully under general anesthesia. The patient had no complaints in the post-anesthesia care unit. CONCLUSION: Unfamiliarity of health care providers with regards to ACM-1 parturients can be countered by increasing awareness of this condition throughout medical specialties involved in their care. The Ghaly Obstetric Guide to Arnold-Chiari malformation Type 1, along with proper training of anesthesia care providers regarding the specificities of ACM-1 parturients aids in better management and understanding of this complex condition.

**Database:** PubMed

### **3. Syringomyelia and pregnancy: A case report and review**

**Author(s):** Acosta Diez J.; Santos Cidon P.

**Source:** Journal of Maternal-Fetal and Neonatal Medicine; May 2010; vol. 23; p. 219

**Publication Date:** May 2010

**Publication Type(s):** Journal: Conference Abstract

Available in full text at [Journal of Maternal-Fetal and Neonatal Medicine, The](#) - from Taylor & Francis

**Abstract:** Brief Introduction: Syringomyelia in pregnancy is still a clinical challenge for both Obstetricians and Anesthesiologists. This case gave us a wider understanding on clinical approach to this rare entity. Conclusions: Syringomyelia is defined as a cystic cavity called syrinx into the spinal cord. There is no medical consensus about the obstetric approach when a woman with syringomyelia is pregnant. Concern is always present about whether the labor may deteriorate the clinical state of the illness. We present the case of a 27 old year woman, who had been diagnosed of syringomyelia 8 years ago. She came to our institution for prenatal care. In a first neurological evaluation, she only presented low sensitive afectation. The case was discussed by an interdisciplinary staff of anestesists, neurologysts and gynecologysts. She had an instrumental vaginal delivery at 37 weeks of pregnancy. Peridural anesthesia was succesfully administrated. Instrumentation was made in order to avoid increased intracranial pressure secondary to maternal effort during contractions. Neurological examination immediately after the delivery showed no deterioration of the symptoms. We expose the details of the case, the MRI images and a review of the literature about this subject.

**Database:** EMBASE

### **4. Maternal Arnold-Chiari type I malformation and syringomyelia: a labor management dilemma.**

**Author(s):** Parker, Jason D; Broberg, Jeffrey C; Napolitano, Peter G

**Source:** American journal of perinatology; Nov 2002; vol. 19 (no. 8); p. 445-450

**Publication Date:** Nov 2002

**Publication Type(s):** Case Reports Journal Article Review

**Abstract:** Arnold-Chiari type I malformations consists of elongation of the cerebellar tonsils with their displacement below the foramen magnum. Syringomyelia is an associated cyst that accumulates cerebrospinal fluid in the cord that can impinge on local nerve fibers. Pregnant women with either of these disorders are of special concern due to the potential risk of brain stem herniation and or spinal column compression from physiological changes that occur during labor. We present two cases. The first case is a patient with syringomyelia who was admitted in labor with worsening peripheral neurological symptoms. Epidural anesthesia was placed and she underwent an uncomplicated cesarean delivery with resolution of her symptoms postpartum. The second case is a patient with an Arnold-Chiari type I malformation and syringomyelia who presented in labor. The patient had an epidural placed and was allowed to progress to complete dilation and effacement at +2 station. She underwent a successful operative vaginal delivery without voluntary maternal expulsive efforts. Both patients had uncomplicated postpartum courses. Although these are rare disorders with significant potential morbidity, labor can be managed by either mode of delivery with careful patient selection. We caution that this review has insufficient numbers of patients to address the safety and efficacy of either delivery mode but rather focuses on alternatives for delivery. This

report is the first to document a case of a patient with an Arnold-Chiari malformation and syringomyelia successfully managed in labor with a vaginal delivery.

**Database:** Medline

### **5. Chiari I malformation with or without syringomyelia and pregnancy: case studies and review of the literature.**

**Author(s):** Mueller, Diane M; Oro', John

**Source:** American journal of perinatology; Feb 2005; vol. 22 (no. 2); p. 67-70

**Publication Date:** Feb 2005

**Publication Type(s):** Case Reports Journal Article Review

**Abstract:** Women with Chiari I malformation with or without syringomyelia are of particular concern because of the potential risk of increased intracranial pressure during pregnancy and delivery. The following questions are most often asked in the clinical setting: Is it safe to have a planned pregnancy? Will the symptoms become worse or recur during pregnancy and will the baby be normal? Seven patients with Chiari I malformation, with and without syringomyelia, submitted checklists of self-reported symptoms experienced during pregnancy, labor, and postpartum. Seven patients with Chiari I malformation with and without syringomyelia were queried for symptoms during pregnancy, labor, and postpartum. None of the patients reported significant increase or recurrence of Chiari-related symptoms during delivery or postpartum. Four of the women had epidural anesthesia for delivery and reported no related symptoms. This series represents a small number of women with Chiari I malformation who had uncomplicated pregnancy, labor, and delivery.

**Database:** Medline

### **6. Management of syringomyelia in pregnancy-a case presentation**

**Author(s):** Hassaballa M.M.; Vaughan H.; Akhtar S.; Tahir A.

**Source:** International Journal of Gynecology and Obstetrics; Oct 2012; vol. 119

**Publication Date:** Oct 2012

**Publication Type(s):** Journal: Conference Abstract

Available in full text at [Intl Jrn Gynecology and Obstet](#) - from John Wiley and Sons

**Abstract:** Objectives: To explore the management of Syringomyelia in pregnancy and to identify pitfalls in treating the disorder. Materials: 28 years old A&E nurse who developed persistent headache and neck pain with signs and symptoms of limbs paraesthesia and weakness. An MRI confirmed the diagnosis of Syringomyelia in 2008 as cyst was found impinging on the CSF. She was managed conservatively. The patient declined surgical interventions in view of spontaneous resolution of the cyst with a subsequent improvement of all the ailments. She fell pregnant in 2011 and was managed jointly with no signs of the disease flaring up and went on to have a normal delivery, without any relevant complications. Methods: The patient case notes and literature search were adopted to reveal that one third of patients with Syringomyelia the clinical course of the disease is static, however in the other two thirds a deterioration is likely to lead to neurological deficits. Results: Syringomyelia is a rare neurological condition which is characterised by the formation of a cyst (syrinx) within the spinal cord. It occurs in 8.4 per 100,000 individuals and affects both men and women equally. The symptoms begin between ages 25-40 years. There is a strong association and probably a causal relationship between traumatic birth and communicating type of Syringomyelia. The aetiology and pathophysiology of the disease remain controversial. It is the expansion of the cyst into the spinal cord that leads to symptoms like headache, weakness and

stiffness in the back, shoulders, arms and legs. Conclusions: There is no significant effect of Syringomyelia on the progress of pregnancy, despite an anecdotal association with IUGR described in literature. The antenatal follow up must be in multidisciplinary manner involving Obstetrician but also neurosurgeons. It is vital to prevent any rise in CSF pressure in the intrapartum period. During epidural anaesthesia, although cerebrospinal pressure is maintained there is a risk of dural puncture and the potential onset of symptoms afterwards, thus spinal anaesthesia is best avoided. In patients with Syringomyelia requiring caesarean section for Obstetrics reason, Suxamethonium should be avoided if General anaesthesia is contemplated, as there is a risk of hyperkalaemia in patients with neurological disorders. The neonatal outcome is usually excellent.

**Database:** EMBASE

### **7. Labor epidural analgesia in an operated patient of syringomyelia with arnold chiari type 1 malformation: A rare case report**

**Author(s):** Natarajan N.; Joseph S.

**Source:** British Journal of Anaesthesia; Mar 2012; vol. 108

**Publication Date:** Mar 2012

**Publication Type(s):** Journal: Conference Abstract

Available in full text at [BJA: British Journal of Anaesthesia](#) - from Oxford University Press ; Collection notes: To access please select Login with Athens and search and select NHS England as your institution before entering your NHS OpenAthens account details.

Available in full text at [British Journal of Anaesthesia](#) - from Highwire Press

**Abstract:** Introduction: Arnold Chiari1 malformation consists of elongation of the cerebellar tonsils with their displacement below the foramen magnum. Syringomyelia is an associated cystic formation in the spinal cord due to disturbed mechanism of cerebrospinal fluid flow, resulting in a degenerative neuropathy. In a labouring woman this condition poses concern because of the potential risk of neurological deterioration as a result of the physiological changes and the interventions during labour and delivery. Epidural analgesia could be beneficial in abolishing pain and thereby the increase in intracranial pressure but at the same time the procedure in itself could aggravate the neurological symptoms. We report the successful management of a normal vaginal delivery under epidural analgesia in a woman with a surgically corrected Arnold Chiari type 1 malformation with syringomyelia and scoliosis. Case Report 26 year old primiparous woman presented in early labour. She had undergone a therapeutic subdural shunt surgery for AC1 malformation with cervicothoracic (up to T11) syringomyelia six years previously. She had minimal residual neurological symptoms like reduced sensation to pain and temperature from T12-L2 and occasional paresthesia of upper limbs. The symptoms were more pronounced on the right side but no aggravation during the pregnancy. She had an associated thoracic scoliosis and right upper limb atrophy. X-ray was done post delivery showing scoliosis with intra thecal shunt at thoracic vertebra level. Upon request from the patient for pain relief Epidural analgesia was planned after detailed discussion with the neurologist and obstetrician. Epidural catheter was placed in. L-3-4. . .level under aseptic precautions. Analgesia was initiated with a titrated bolus dose of 10 ml of 0.0625% bupivacaine +50 mug fentanyl and was continued until delivery with 6ml /hour of 0.125% bupivacaine +2 mu/ml fentanyl. She had an uneventful vacuum assisted vaginal delivery. The patient was reviewed 2 weeks latter by the neurologist with a MRI spine and a detailed examination revealed the same neurological findings before going for the labour epidural. MRI: shows right syringo-hydromyelia along the cervical and upper dorsal spinal cord. Discussion: Syringomyelia is a rare progressive degenerative neuropathy characterised by cystic formation within the spinal cord with accumulation of cerebrospinal fluid that can impinge on nerve fibres resulting in neurological

manifestations. The congenital form commonly is associated with Arnold-Chiari 1 malformation and occurs in the cervicothoracic level. The preferred mode of delivery and anaesthesia in a parturient with syringomyelia is controversial. The prime concern is avoidance of straining and thus fluctuation in the intracranial pressure during the labour and delivery. Only few reports of successful vaginal delivery under epidural analgesia are present. The major concerns during epidural anaesthesia in such patients are: 1) Further neurological deterioration 2) Technical difficulties especially due to the presence of spine abnormalities like scoliosis 3) Increased risk of dural puncture 4) Abnormalities of autonomic nervous system can cause exaggerated cardiovascular instability 5) Unpredictability of the level of sensory blockade. Conclusion: The use of Epidural analgesia for parturient with Neurological conditions like Arnold chiari malformation with syringomyelia is controversial; we would like to highlight that a meticulously done low dose epidural analgesia is still an option considering the benefits in such patients.

**Database:** EMBASE

### **8. A successful pregnancy outcome after surgical decompression of type 1 Arnold-Chiari malformation**

**Author(s):** Ip P.; Dann P.; Pankaja S.; O'Mahony F.

**Source:** BJOG: An International Journal of Obstetrics and Gynaecology; Apr 2015; vol. 122 ; p. 263

**Publication Date:** Apr 2015

**Publication Type(s):** Journal: Conference Abstract

Available in full text at [BJOG: An International Journal of Obstetrics and Gynaecology](#) - from John Wiley and Sons

**Abstract:** Introduction Type 1 Arnold-Chiari malformation (ACM) usually presents in adulthood and consists of a downward displacement of the cerebellar tonsils through the foramen magnum. Case A 25-year-old woman presented with a 5-month history of headache associated with blurred vision, tinnitus and sickness. Imaging recognised the need for surgical intervention, but whilst awaiting for surgery she fell pregnant. Considering the risks of neurological deterioration, the woman underwent surgical decompression of type 1 ACM at 15 weeks gestation. She subsequently presented with progressively worsening headaches during late pregnancy from 35 weeks. The obstetric plan was initially induction of labour at term but since the onset of worsening symptoms, this date was brought forward to 39+1 weeks gestation. She proceeded to have a normal delivery with no neonatal complications and an uneventful puerperium followed. Since the delivery, the patient reported fewer symptoms, showed no signs of neurological deficit and a repeat MRI showed good relief of neural compression. Conclusion This case illustrates how judicious selection of the appropriate mode of delivery of women following surgically corrected ACM and a multidisciplinary approach is critical in the successful management of the antepartum and labour.

**Database:** EMBASE

## **9. Maternal and pregnancy complications among women with arnold chiari malformation: A national database review**

**Author(s):** Orth T.; Babbar S.; Porter B.; Lu G.; Gerkovich M.

**Source:** American Journal of Obstetrics and Gynecology; Jan 2015; vol. 212 (no. 1)

**Publication Date:** Jan 2015

**Publication Type(s):** Journal: Conference Abstract

**Abstract:** OBJECTIVE: The objective of this study was to estimate nationwide prevalence of medical and pregnancy complications at delivery among pregnant women with congenital Arnold Chiari malformation. STUDY DESIGN: The Nationwide Inpatient Sample for the years 2008- 2011 was queried for all delivery-related discharges. Women with Arnold Chiari malformation (ACM) were identified by ICD-9 codes and compared to women without ACM. The prevalence of selected severe medical and obstetric complications during admission for delivery were compared between the two groups while controlling for age, multiple gestation, and pre-existing medical complications (diabetes, hypertension, tobacco and alcohol use). RESULTS: From 2008-2011, there were 1,280 deliveries to women with ACM and 16,028,580 deliveries to women without ACM (8.0 per 100,000 deliveries). Compared to women without ACM, women with ACM were more likely to be Caucasian (52% versus 74%) and less likely to be Hispanic (23% versus 8%). Women with ACM were not more likely to die during delivery-related admissions despite more frequent severe morbidity . Women with ACM were 2.2-942 times more likely to develop severe medical complications including acute respiratory distress syndrome, stroke/cardiovascular accident, sepsis and seizures (Table). Women with ACM were also more likely to be delivered by cesarean (adjusted OR [aOR] 15.6, CI 11.0, 22.1) or develop preeclampsia (aOR 2.2, CI 1.3, 3.6), or develop eclampsia (aOR 16.2, CI 6.7, 39.3). CONCLUSION: Pregnant women with ACM are significantly more likely to experience serious medical and obstetric complications at the time of delivery compared to women without ACM. Women with ACM should be counseled of these risks prior to becoming pregnant and once pregnant, should be managed by a multidisciplinary team at a specialized center. (Table Presented).

**Database:** EMBASE

## **10. Spinal anesthesia for cesarean delivery in a patient with syringomyelia.**

**Author(s):** Hönemann, Christian; Moormann, Simon; Hagemann, Olaf; Doll, Dietrich

**Source:** International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics; May 2014; vol. 125 (no. 2); p. 172-174

**Publication Date:** May 2014

**Publication Type(s):** Research Support, Non-u.s. Gov't Case Reports Journal Article  
Available in full text at [Intl Jrn Gynecology and Obstet](#) - from John Wiley and Sons

**Database:** Medline

### **11. A Successful Pregnancy Outcome After Antenatal Surgical Decompression of Arnold Chiari Malformation**

**Author(s):** Bag T.; Saha D.P.; Dutta R.; De A.K.; Shah A.

**Source:** Journal of Obstetrics and Gynecology of India; 2013 ; p. 1-3

**Publication Date:** 2013

**Publication Type(s):** Journal: Article In Press

Available in full text at [Journal of Obstetrics and Gynaecology of India](#) - from National Library of Medicine

Available in full text at [Journal of Obstetrics and Gynecology of India, The](#) - from Springer Link Journals

**Database:** EMBASE

### **12. Spontaneous resolution of Chiari I malformation and associated syringomyelia following parturition.**

**Author(s):** Muthukumar, Natarajan; Christopher, John

**Source:** Acta neurochirurgica; May 2013; vol. 155 (no. 5); p. 817-818

**Publication Date:** May 2013

**Publication Type(s):** Letter Case Reports

Available in full text at [Acta Neurochirurgica](#) - from ProQuest

Available in full text at [Acta Neurochirurgica](#) - from Springer Link Journals

**Database:** Medline

### **13. Anesthetic management during Cesarean section in a woman with residual Arnold-Chiari malformation Type I, cervical kyphosis, and syringomyelia.**

**Author(s):** Ghaly, Ramsis F; Candido, Kenneth D; Sauer, Ruben; Knezevic, Nebojsa Nick

**Source:** Surgical neurology international; 2012; vol. 3 ; p. 26

**Publication Date:** 2012

**Publication Type(s):** Journal Article

Available in full text at [Surgical Neurology International](#) - from National Library of Medicine

Available in full text at [Surgical Neurology International](#) - from ProQuest

**Abstract:**BACKGROUND Type I Arnold-Chiari malformation (ACM) has an adult onset and consists of a downward displacement of the cerebellar tonsils and the medulla through the foramen magnum. There is paucity of literature on the anesthetic management during pregnancy of residual ACM Type I, with cervical xyphosis and persistent syringomyelia.CASE DESCRIPTIONA 34-year-old woman with surgically corrected ACM Type I presented for Cesarean delivery. A recent MRI demonstrated worsening of cervical xyphosis after several laminectomies and residual syringomyelia besides syringopleural shunt. Awake fiberoptic intubation was performed under generous topical anesthesia to minimize head and neck movement during endotracheal intubation. We used a multimodal general anesthesia without neuromuscular blockade. The neck was maintained in a neutral position. Following delivery, the patient completely recovered in post-anesthesia care unit (PACU), with no headache and no exacerbation or worsening of neurological function.CONCLUSIONS The present case demonstrates that patients with partially corrected ACM, syringomyelia, cervical kyphosis, and

difficult intubation undergoing Cesarean delivery require an interdisciplinary team approach, diligent preparation, and skilled physicians.

**Database:** Medline

#### **14. Anaesthesia for caesarean section in a patient with lumbar syringomyelia.**

**Author(s):** Jayaraman, Lakshmi; Sethi, Nitin; Sood, Jayashree

**Source:** Revista brasileira de anesthesiologia; 2011; vol. 61 (no. 4); p. 469-473

**Publication Date:** 2011

**Publication Type(s):** Case Reports Journal Article

**Abstract:** BACKGROUND AND OBJECTIVES Syringomyelia is a rare neurological condition characterized by the presence of an expansive cystic cavity in the spinal cord, resulting in several neurologic manifestations. The objective of the present report was to address the safety of general anesthesia in this group of patients. CASE REPORT This is a 28-year old primipara with lumbar syringomyelia scheduled for lower segment cesarean section (LSC). Surgery was performed under general anesthesia without complications. General anesthesia was chosen for this patient to avoid manipulation of the subarachnoid space during neuraxial anesthesia, which could cause changes in intracranial pressure or worsening neurological symptoms. We used rocuronium considering that it avoids rising in cerebrospinal fluid pressure and hyperkalemia that can be seen with succinylcholine. CONCLUSIONS General anesthesia can be safely used in patients with syringomyelia. Care should be taken to prevent increase in intracranial pressure and neuromuscular blockade should be monitored.

**Database:** Medline

#### **15. Epidural anesthesia for caesarean section in a patient with syringomyelia**

**Author(s):** Hayashi T.; Katayama M.; Ohwada T.; Ohnuma T.; Hoshiyama Y.; Sekimoto F.; Kodama R.; Shimizu M.; Soejima K.; Aoki K.; Shimizu H.

**Source:** Regional Anesthesia and Pain Medicine; 2011; vol. 36 (no. 5)

**Publication Date:** 2011

**Publication Type(s):** Journal: Conference Abstract

Available in full text at [Regional Anesthesia and Pain Medicine](#) - from Ovid

**Abstract:** A 33-year-old primiparous woman (height 158.5cm, weight 55.5kg) with syringomyelia was scheduled to undergo caesarean section for preventing excessive straining during vaginal delivery. Syringomyelia had been diagnosed after a magnetic resonance imaging (MRI) scan, performed 2 years earlier, to investigate a history of dizziness. Syrinx was found 2cm from the C3 level of spinal cord. The patient also had a history of generalized anxiety disorder and euthyroid nodular goiter. Elective caesarean section was performed at 38 weeks' gestation under epidural anesthesia. Epidural catheter was placed at L3-4 interspace. Analgesia was established using a total dose of 19ml of 2% mepivacaine. The height of the block was assessed as T4 bilaterally. Surgery was initiated and a healthy baby was delivered 8 minutes later. Additional doses of 0.75% ropivacaine (6ml then 4ml) were given for maintenance. Surgery was ended without complications after 58 minutes, with measured blood loss of 685ml. The patient was discharged 8 days later without neurological complications. A critical point of anesthesia for the patient with syringomyelia is to avoid aggravating the already disturbed cerebrospinal fluid (CSF) pressure relationship. General anesthesia has the potential hazard of airway complications, especially in primiparous women. Although the presence of active neurological disease is no longer considered an absolute contraindication to regional



anesthesia, spinal anesthesia is best avoided in syringomyelia, as previous reports suggested that puncture aggravated signs and symptoms. Epidural anesthesia can avoid precipitate decrease in blood and CSF pressures, thus circumventing aggravation of syringomyelia, resulting in potential neurological defects.

**Database:** EMBASE

#### **16. Cesarean delivery in a parturient with syringomyelia and worsening neurological symptoms.**

**Author(s):** Nielsen, Janel L; Bejjani, Ghassan K; Vallejo, Manuel C

**Source:** Journal of clinical anesthesia; Dec 2011; vol. 23 (no. 8); p. 653-656

**Publication Date:** Dec 2011

**Publication Type(s):** Case Reports Journal Article

Available in full text at [Journal of Clinical Anesthesia](#) - from ProQuest

**Abstract:**A parturient presented at 35 weeks' gestation with worsening neurological symptoms caused by syringomyelia. She underwent urgent cesarean delivery. The etiology and anesthetic considerations for an obstetrical patient with syringomyelia are discussed.

**Database:** Medline

#### **17. Epidural anesthesia for Cesarean delivery in a patient with post-traumatic cervical syringomyelia.**

**Author(s):** Margarido, Clarita; Mikhael, Rafeek; Salman, Aliya; Balki, Mrinalini

**Source:** Canadian journal of anaesthesia = Journal canadien d'anesthesie; Aug 2011; vol. 58 (no. 8); p. 764-768

**Publication Date:** Aug 2011

**Publication Type(s):** Case Reports Journal Article

Available in full text at [Canadian Journal of Anesthesia/Journal canadien d'anesthesie](#) - from Springer Link Journals

Available in full text at [Canadian Journal of Anesthesia](#) - from ProQuest

**Abstract:****PURPOSE**To illustrate the successful management of a patient with post-traumatic syringomyelia (PTS) and chronic pain syndrome who presented for elective Cesarean delivery under epidural anesthesia.**CLINICAL FINDINGS**A 30-yr-old gravida 3 para 1 woman, with a known diagnosis of cervical PTS secondary to a whiplash injury sustained three years earlier, presented to the labour and delivery unit at 31 weeks' gestation. She had severe pain in the cervical and lumbar spine, motor and sensory deficits in the upper extremities, tender mass in her left trapezius muscle, and history of dizziness and syncopal episodes. She was taking oxycodone 120 mg·day<sup>-1</sup> Magnetic resonance imaging of her spine revealed a syrinx of 2 mm in diameter extending from C4 to T1 levels with disc protrusions in the C4-C6 region. There was no evidence of Arnold-Chiari malformation or elevated intracranial pressure. On airway examination, her Mallampati score appeared normal, but there was a limitation in the range of her neck movements in all directions. An elective Cesarean delivery was planned at 39 weeks' gestation. An epidural catheter was placed using ultrasound guidance, and the procedure was performed without complications.**CONCLUSIONS** The successful management of this case suggests that epidural can be considered in women with cervical PTS presenting for a Cesarean delivery.

**Database:** Medline

## **18. Arnold Chiari malformation in pregnancy**

**Author(s):** Srinivasan M.; Ghosh S.

**Source:** International Journal of Gynecology and Obstetrics; Oct 2009; vol. 107

**Publication Date:** Oct 2009

**Publication Type(s):** Journal: Conference Abstract

Available in full text at [Intl Jrnل Gynecology and Obstet](#) - from John Wiley and Sons

**Abstract:**Introduction: Type I Chiari malformation consists on the caudal displacement of cerebellar tonsils through the foramen magnum. It is often asymptomatic, although it may display symptoms as a result of cerebellum, brainstem, high cervical spinal cord or the lower cranial nerve, involvement. Objective: Here we present a case report of a woman who was diagnosed with Arnold chiari malformation. Her symptoms started to worsen during pregnancy which made early delivery and foramen magnum dilatation in the postpartum period. Case report: 28 yr old second gravida had an uneventful delivery in 2003. She was diagnosed to have horizontal nystagmus following an optician visit. Further investigations by neurosurgeons revealed that she had Arnold chiari malformation along with leptomeningeal cyst. She found herself pregnant and was booked in our hospital. She was under multi disciplinary team of obstetrician, anaesthetist and neurosurgeons. She was planned for elective caesarean section at 39 weeks. But unfortunately her symptom of nystagmus got worse. She was admitted in University hospital. She had elective caesarean section under general anaesthesia at 37 weeks and 2 weeks later she underwent Foramen magnum dilatation. She recovered well and was discharged. She had follow up 6 weeks later. Conclusion: Labour and vaginal delivery appears to be a major threat in these women due to straining during second stage which may be fatal. There was a case report in which a woman had instrumental delivery under epidural anaesthesia. Further research in this area is needed.

**Database:** EMBASE

## **19. Uneventful epidural labor analgesia and vaginal delivery in a parturient with Arnold-Chiari malformation type I and sickle cell disease**

**Author(s):** Newhouse B.J.; Kuczkowski K.M.

**Source:** Archives of Gynecology and Obstetrics; Apr 2007; vol. 275 (no. 4); p. 311-313

**Publication Date:** Apr 2007

**Publication Type(s):** Journal: Article

Available in full text at [Archives of Gynecology and Obstetrics](#) - from Springer Link Journals

**Abstract:**Arnold-Chiari malformation is a disorder of the hindbrain which can lead to altered craniospinal pressures and abnormal flow of cerebrospinal fluid. The possibility of increased intracranial pressure imparts significant risk during labor and delivery, and has led to concern over the use of neuraxial anesthesia. Sickle cell disease is a disorder of abnormal hemoglobin that is prone to sickling under stressful conditions. The physiologic and metabolic changes associated with pregnancy and labor can precipitate sickling, which increases risks for both the mother and the fetus. Vaso-occlusive pain crisis in a parturient with sickle cell disease has been shown to improve with the initiation of neuraxial anesthesia. We present the first reported case of a parturient with both Arnold-Chiari malformation type I and sickle cell disease who presented to labor and delivery with acute pain crisis and who subsequently received epidural labor analgesia and underwent successful vaginal delivery. We include a discussion of the risks associated with pregnancy, labor, neuraxial anesthesia, and delivery in a patient with Arnold-Chiari malformation type I and sickle cell disease. © 2006 Springer-Verlag.

**Database:** EMBASE

## **20. Anaesthesia for caesarean section in a patient with syringomyelia and Arnold-Chiari type I malformation.**

**Author(s):** Agustí, M; Adàlia, R; Fernández, C; Gomar, C

**Source:** International journal of obstetric anesthesia; Apr 2004; vol. 13 (no. 2); p. 114-116

**Publication Date:** Apr 2004

**Publication Type(s):** Case Reports Journal Article

**Abstract:**A 37-year-old primiparous woman with syringomyelia and Arnold-Chiari type I malformation was scheduled to undergo elective caesarean section for a fetus in the breech presentation. Caesarean section was performed under general anaesthesia without complications; all we observed was an exaggerated response to atracurium. The patient was discharged home 7 days after the operation without neurological deterioration. General anaesthesia was chosen in this patient to avoid any spinal manipulation that could increase intracranial pressure or reduce intraspinal pressure and cause deterioration of neurological symptoms. Syringomyelia is a progressive myelopathy characterised by cystic degeneration within the spinal cord, which causes severe neurological deficits. The anaesthetic management is discussed.

**Database:** Medline

## **21. Chiari I malformation in parturients**

**Author(s):** Chantigian R.C.; Koehn M.A.; Ramin K.D.; Warner M.A.

**Source:** Journal of Clinical Anesthesia; 2002; vol. 14 (no. 3); p. 201-205

**Publication Date:** 2002

**Publication Type(s):** Journal: Article

**Abstract:**Study Objective: To assess complications of regional as well as general anesthesia in parturients with Chiari I malformation. Design: Retrospective chart review. Setting: Academic medical center. Patients: All parturients in our institution who had the diagnosis of Chiari I malformation and delivered in our hospitals over a 50-year period. Main Results: 12 parturients delivered 30 babies. Three deliveries were facilitated with general anesthesia. Nine deliveries were facilitated with central axis anesthesia, six with epidural anesthesia, two with a single injection of a spinal anesthetic, and one with a continuous spinal catheter. The patient who received a continuous spinal catheter developed a postdural puncture headache that resolved with an epidural blood patch. None of the patients who received general, spinal, or epidural anesthesia for their deliveries developed symptoms or had exacerbation of preexisting symptoms of Chiari I malformation. Conclusions: General anesthesia, as well as spinal and epidural anesthesia, appeared to be safe and effective in our series of vaginal or cesarean delivery patients. The small number of patients in our series does not negate the cautious recommendations of others, but suggests that general anesthesia, as well as spinal or epidural anesthesia, can be used safely and effectively in these patients. © 2002 by Elsevier Science Inc.

**Database:** EMBASE

## 22. Syringomyelia and pregnancy-case report.

**Author(s):** Daskalakis, G J; Katsetos, C N; Papageorgiou, I S; Antsaklis, A J; Vogas, E K; Grivachevski, V I; Michalas, S K

**Source:** European journal of obstetrics, gynecology, and reproductive biology; Jul 2001; vol. 97 (no. 1); p. 98-100

**Publication Date:** Jul 2001

**Publication Type(s):** Case Reports Journal Article

**Abstract:**The course of a pregnancy in a woman with syringomyelia is presented. She was first admitted at 28 weeks' gestation suffering neurologic symptoms associated with a spinal cord injury, which had happened in the past. The disease was diagnosed with a magnetic resonance imaging (MRI). Delivery was accomplished by elective caesarean section under general anaesthesia at 37 weeks, in order to avoid straining during the second stage of an imminent labour.

**Database:** Medline

## 23. Cesarean section in a patient with syringomyelia.

**Author(s):** Murayama, K; Mamiya, K; Nozaki, K; Sakurai, K; Sengoku, K; Takahata, O; Iwasaki, H

**Source:** Canadian journal of anaesthesia = Journal canadien d'anesthesie; May 2001; vol. 48 (no. 5); p. 474-477

**Publication Date:** May 2001

**Publication Type(s):** Case Reports Journal Article

Available in full text at [Canadian Journal of Anesthesia/Journal canadien d'anesthesie](#) - from Springer Link Journals

Available in full text at [Canadian Journal of Anesthesia](#) - from Free Access Content

Available in full text at [Canadian Journal of Anesthesia](#) - from ProQuest

**Abstract:****PURPOSE**To describe the anesthetic management of Cesarean section in a patient with syringomyelia.**CLINICAL FEATURES**A 27-yr-old pregnant woman with syringomyelia was scheduled to undergo elective Cesarean section. At the age of 25 yr, she had begun to experience headaches, and at the age of 26 yr, a diagnosis of syringomyelia of the upper spinal cord was made on the basis of magnetic resonance imaging findings. No symptoms other than headache were noted preoperatively. General anesthesia was used for the Cesarean section. After the administration of 1 mg vecuronium as a priming dose, 5 mg vecuronium were injected. At the onset of clinical muscle weakness, 225 mg thiamylal were promptly administered as the induction agent and the patient was intubated (timing principle with priming method) and pressure on the cricoid cartilage applied to prevent regurgitation of stomach contents. Anesthesia was maintained with oxygen, nitrous oxide and isoflurane at a low concentration. Mild hyperventilation was used throughout the procedure. Anesthesia and surgery proceeded without any problem, response to vecuronium was clinically normal and recovery was uneventful. Neurological status remained normal.**CONCLUSION**We report the safe use of general anesthesia for Cesarean section in a patient with syringomyelia. Precautions were taken to avoid increases in intracranial pressure and our patient experienced no untoward neurologic event.

**Database:** Medline

#### **24. Arnold-Chiari malformation and pregnancy.**

**Author(s):** Penney, D J; Smallman, J M

**Source:** International journal of obstetric anesthesia; Apr 2001; vol. 10 (no. 2); p. 139-141

**Publication Date:** Apr 2001

**Publication Type(s):** Journal Article

**Abstract:**Chiari (or Arnold-Chiari) malformations are a continuum of abnormalities of the hindbrain with the possibility of disordered cerebrospinal fluid flow and craniospinal pressure gradients. We describe the management of a 30-year-old primigravida who presented following a grand mal seizure during the first trimester. A Chiari type I malformation was diagnosed radiologically. She was delivered at term by elective caesarean section using a general anaesthetic technique. The difficulties in anaesthetising the patient with Chiari malformation are considered, and a literature review is presented to illustrate the risk-benefit analysis undertaken.

#### **25. Extradural anaesthesia for caesarean section in a patient with syringomyelia and Chiari type I anomaly.**

**Author(s):** Nel, M R; Robson, V; Robinson, P N

**Source:** British journal of anaesthesia; Apr 1998; vol. 80 (no. 4); p. 512-515

**Publication Date:** Apr 1998

**Publication Type(s):** Case Reports Journal Article

Available in full text at [BJA: British Journal of Anaesthesia](#) - from Oxford University Press ; Collection notes: To access please select Login with Athens and search and select NHS England as your institution before entering your NHS OpenAthens account details.

Available in full text at [British Journal of Anaesthesia](#) - from Highwire Press

**Abstract:**We describe elective Caesarean section performed under extradural anaesthesia in a parturient with symptomatic syringomyelia and coexisting Chiari type I anomaly. Syringomyelia is reviewed and the anaesthetic implications of the condition discussed. Anaesthesia should be directed primarily at avoidance of increased intracranial pressure, which can cause sudden deterioration in these patients.

#### **26. Anaesthesia for caesarean section in a patient with syringomyelia. A case report.**

**Author(s):** Roelofse, J A; Shipton, E A; Nell, A C

**Source:** South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde; May 1984; vol. 65 (no. 18); p. 736-737

**Publication Date:** May 1984

**Publication Type(s):** Case Reports Journal Article

**Abstract:**A 27-year-old White woman with syringomyelia underwent a caesarean section. The pre-operative preparation and anaesthetic management are presented, and the specific problems discussed.

**DISCLAIMER:** Results of database and or Internet searches are subject to the limitations of both the database(s) searched, and by your search request. It is the responsibility of the requestor to determine the accuracy, validity and interpretation of the results.



## Strategy 151554

#	Database	Search term	Results
1	Medline	exp SYRINGOMYELIA/	3572
2	Medline	(Syringomyelia).ti,ab	3112
3	Medline	(syrinx).ti,ab	1422
4	Medline	(1 OR 2 OR 3)	4846
5	Medline	exp PREGNANCY/	803297
6	Medline	(pregn*).ti,ab	392284
7	Medline	(5 OR 6)	884301
8	Medline	(4 AND 7)	71
9	Medline	exp "LABOR, OBSTETRIC"/	0
10	Medline	("LABOR, OBSTETRIC").ti,ab,af	27976
11	Medline	(4 AND 10)	1
12	Medline	exp "OBSTETRIC LABOR COMPLICATIONS"/	59924
13	Medline	(4 AND 12)	11
14	EMBASE	exp SYRINGOMYELIA/	4942
15	EMBASE	(Syringomyelia).ti,ab	3634
16	EMBASE	(syrinx).ti,ab	1746
17	EMBASE	(14 OR 15 OR 16)	5916
18	EMBASE	exp PREGNANCY/	722248
19	EMBASE	(pregn*).ti,ab	542724

20	EMBASE	exp "LABOR COMPLICATION"/175452	
21	EMBASE	exp LABOR/	36392
22	EMBASE	(18 OR 19 OR 20 OR 21)	965476
23	EMBASE	(17 AND 22)	102
24	CINAHL	(Syringomyelia).ti,ab	164
25	CINAHL	(syrinx).ti,ab	71
26	CINAHL	exp SYRINGOMYELIA/	194
27	CINAHL	(24 OR 25 OR 26)	263
28	CINAHL	(pregn*).ti,ab	52446
29	CINAHL	exp LABOR/ OR exp PREGNANCY/	108737
30	CINAHL	(28 OR 29)	120612
31	CINAHL	(27 AND 30)	7
32	PubMed	(Syringomyelia).ti,ab	4350
33	PubMed	(syrinx).ti,ab	1447
34	PubMed	(32 OR 33)	4867
35	PubMed	(pregn*).ti,ab	903660
36	PubMed	(labour OR labor).ti,ab	936753
37	PubMed	(35 OR 36)	1736078
38	PubMed	(34 AND 37)	138
39	Medline	exp "ARNOLD-CHIARI MALFORMATION"/	2999
40	Medline	(7 AND 39)	132



41	Medline	(12 AND 39)	11
42	EMBASE	*"ARNOLD CHIARI MALFORMATION"/	2813
43	EMBASE	(22 AND 42)	107