



## Subarachnoid haemorrhage (SAH) in pregnancy

**Date of Search: 30/08/2016**

**Sources Searched: Medline, Embase, Cinahl.**

### **Search History:**

2. Medline; "subarachnoid haemorrhag\*".ti,ab; 3803 results.
3. Medline; "subarachnoid hemorrhag\*".ti,ab; 15902 results.
4. Medline; exp SUBARACHNOID HEMORRHAGE/; 18127 results.
5. Medline; 2 OR 3 OR 4; 24920 results.
6. Medline; pregn\*.ti,ab; 377226 results.
7. Medline; exp PREGNANCY/; 791879 results.
8. Medline; 6 OR 7; 864351 results.
9. Medline; 5 AND 8; 424 results.
10. Medline; exp INTRACRANIAL ANEURYSM/; 23597 results.
11. Medline; "cerebral aneurysm\*".ti,ab; 4952 results.
12. Medline; 10 OR 11; 24723 results.
13. Medline; 8 AND 12; 311 results.
14. Medline; 9 OR 13; 637 results.
15. Medline; (postpartum OR postnatal\*).ti,ab; 135840 results.
16. Medline; exp POSTPARTUM PERIOD/; 54367 results.
17. Medline; intrapartum.ti,ab; 6880 results.
18. Medline; "intra partum".ti,ab; 296 results.
19. Medline; 8 OR 15 OR 16 OR 17 OR 18; 956329 results.
20. Medline; 5 OR 12; 41768 results.
21. Medline; 19 AND 20; 691 results.
22. Medline; 21 [Limit to: Publication Year 2006-2016 and (Language English)]; 167 results.
23. EMBASE; "subarachnoid haemorrhag\*".ti,ab; 4955 results.
24. EMBASE; "subarachnoid hemorrhag\*".ti,ab; 20601 results.
25. EMBASE; exp SUBARACHNOID HEMORRHAGE/; 33998 results.
26. EMBASE; "cerebral aneurysm\*".ti,ab; 6271 results.
27. EMBASE; exp BRAIN ARTERY ANEURYSM/; 13457 results.
28. EMBASE; 23 OR 24 OR 25 OR 26 OR 27; 47468 results.
29. EMBASE; pregn\*.ti,ab; 509081 results.
30. EMBASE; exp PREGNANCY/; 625944 results.
31. EMBASE; (postpartum OR postnatal\*).ti,ab; 152062 results.
32. EMBASE; intrapartum.ti,ab; 8596 results.
33. EMBASE; "intra partum".ti,ab; 423 results.
34. EMBASE; exp PERINATAL PERIOD/; 26223 results.

35. EMBASE; exp OBSTETRIC PATIENT/; 1107 results.
36. EMBASE; 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35; 914430 results.
37. EMBASE; 28 AND 36; 804 results.
38. EMBASE; 37 [Limit to: English Language and Publication Year 2006-2016]; 417 results.
39. CINAHL; "subarachnoid haemorrhag\*".ti,ab; 313 results.
40. CINAHL; "subarachnoid hemorrhag\*".ti,ab; 1665 results.
41. CINAHL; exp SUBARACHNOID HEMORRHAGE/; 1933 results.
42. CINAHL; exp INTRACRANIAL ANEURYSM/; 0 results.
43. CINAHL; "cerebral aneurysm\*".ti,ab; 271 results.
44. CINAHL; exp CEREBRAL ANEURYSM/; 1246 results.
45. CINAHL; 39 OR 40 OR 41 OR 43 OR 44; 3357 results.
46. CINAHL; pregn\*.ti,ab; 50217 results.
47. CINAHL; exp PREGNANCY/; 107314 results.
48. CINAHL; (postpartum OR postnatal\*).ti,ab; 14359 results.
49. CINAHL; intrapartum.ti,ab; 1634 results.
50. CINAHL; "intra partum".ti,ab; 14 results.
51. CINAHL; exp POSTNATAL PERIOD/; 5927 results.
52. CINAHL; 46 OR 47 OR 48 OR 49 OR 50 OR 51; 125237 results.
53. CINAHL; 45 AND 52; 67 results.
54. CINAHL; 53 [Limit to: Publication Year 2006-2016 and (Language English)]; 42 results.
55. Medline; exp PREGNANCY COMPLICATIONS, CARDIOVASCULAR/; 15809 results.
56. Medline; 5 AND 55; 139 results.
57. Medline; 12 AND 55; 124 results.
58. Medline; 56 OR 57; 205 results.
59. Medline; 58 [Limit to: Publication Year 2006-2016 and (Language English)]; 34 results.
60. EMBASE; exp PRENATAL PERIOD/; 8136 results.
61. EMBASE; 28 AND 60; 9 results.
62. Medline; exp PRECONCEPTION CARE/; 1658 results.
63. EMBASE; exp PUERPERIUM/; 49721 results.
64. EMBASE; 28 AND 63; 161 results.
65. EMBASE; 64 [Limit to: English Language and Publication Year 2006-2016]; 116 results.

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**Title:** Treatment of a giant arteriovenous malformation associated with intracranial aneurysm rupture during pregnancy: A case report

**Citation:** Experimental and Therapeutic Medicine, September 2016, vol./is. 12/3(1337-1340), 1792-0981;1792-1015 (September 2016)

**Author(s):** Chen J., Wang Y., Li P., Chen W., Zhou J., Hu X., Zhu J., Jiang B.

**Language:** English

**Abstract:** Arteriovenous malformations (AVMs) associated with aneurysm have rarely been reported in the literature. The present study reports the case of a 21-year-old pregnant female patient who presented with a subarachnoid hemorrhage and an intracranial hematoma located in the anterior end of the corpus callosum. Furthermore, an anterior cerebral aneurysm and an AVM were identified by digital subtraction angiography and

magnetic resonance angiography. The aneurysm was clipped and the AVM was successfully removed by microsurgery. The diagnosis of AVM associated with an aneurysm was confirmed via intraoperative and postoperative pathological examinations. By performing a review of the current literature, issues and surgical considerations associated with AVM associated with aneurysm were analyzed.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Neurological Complications of Pregnancy

**Citation:** Current Neurology and Neuroscience Reports, July 2016, vol./is. 16/7(no pagination), 1528-4042;1534-6293 (01 Jul 2016)

**Author(s):** Block H.S.

**Language:** English

**Abstract:** Physiologic alterations during pregnancy create an environment for the occurrence of disease states that are either unique to pregnancy, occur more frequently in pregnancy, or require special management considerations that may be different from the nonpregnancy state. In the realm of cerebrovascular disease, preeclampsia, eclampsia, reversible cerebral vasoconstriction syndrome, sources of cardiogenic embolization including peripartum cardiomyopathy, cerebral venous thrombosis, pituitary apoplexy, subarachnoid hemorrhage, intracerebral hemorrhage, and special considerations for anticoagulation during pregnancy will be discussed. Management of epilepsy during pregnancy counterbalances maternal freedom from seizures against the potential for major, minor, cognitive, and behavioral fetal deformities. Teratogenic potential of the most common anticonvulsants are described. Considerations for anticonvulsant level monitoring during pregnancy are based upon differences in medication clearance in comparison to the prepregnancy state. The most common neuromuscular disorders of pregnancy are reviewed.

**Publication Type:** Journal: Review

**Source:** EMBASE

**Full Text:**

Available from *Springer Link Journals* in [Current Neurology and Neuroscience Reports](#)

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**Title:** Aneurysmal Subarachnoid Hemorrhage in Pregnancy-Case Series, Review, and Pooled Data Analysis.

**Citation:** World neurosurgery, Apr 2016, vol. 88, p. 383-398, 1878-8769 (April 2016)

**Author(s):** Robba, Chiara, Bacigaluppi, Susanna, Bragazzi, Nicola Luigi, Bilotta, Federico, Sekhon, Mypinder S, Bertuetti, Rita, Ercole, Ari, Bertuccio, Alessandro, Czosnyka, Marek, Matta, Basil

**Abstract:** Aneurysmal subarachnoid hemorrhage (aSAH) during pregnancy represents an important cause of maternal and fetal morbidity and mortality. Approaches to diagnostics and treatment are still controversial, and there are only a limited number of cases described in the literature. Our study examines the management of aSAH in pregnant patients, creating a case series by combining patients from our hospital records with those from the limited available literature. Data collected from Addenbrooke's Hospital records and cases published between January 1995 and January 2015 were studied. Chi-square test, exact Fisher's test, and chi-square test for trend were used for analyzing categorical data, while the t-test and Mann-Whitney-Wilcoxon test were used for continuous data. Fifty-two patients were included. The mean age was  $31.47 \pm 5.80$ , and most patients were in their third trimester. A univariate pooled data analysis suggested that the maternal outcome may depend on the mother's age, mother's Hunt and Hess scale score, Glasgow Coma Scale at arrival, treatment modality for the aneurysm, mode, and timing of delivery. However, at the multivariate analysis only the presence of general complications resulted in a significant impact on maternal outcome. Ruptured aneurysms in pregnant patients with aSAH may be safely secured in a timely manner. The diagnostic and treatment strategy for each of these patients should consider peculiar maternal and obstetric factors and requires a multidisciplinary assessment involving obstetrics, neurosurgeons, and intensivists. Considering the observed statistical power of our series, our findings should be taken with caution and should be supported by further systematic data collection. Copyright © 2016 Elsevier Inc. All rights reserved.

**Source:** Medline

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**Title:** Neurologic Complications in Pregnancy

**Citation:** Critical Care Clinics, January 2016, vol./is. 32/1(43-59), 0749-0704;1557-8232 (January 2016)

**Author(s):** Cuero M.R., Varelas P.N.

**Language:** English

**Publication Type:** Journal: Review

**Source:** EMBASE

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**Title:** De novo headache during pregnancy and puerperium

**Citation:** Neurologist, 2016, vol./is. 21/1(1-7), 1074-7931 (2016)

**Author(s):** Spierings E.L.H., Sabin T.D.

**Language:** English

**Abstract:** Background: A conservative estimate is that approximately 5% of pregnancies are affected by de novo headache, that is, new-onset or new-type headache. Objectives: (1) Summarize the available literature, which is exclusively neurological, regarding de novo headache during the third trimester of pregnancy and puerperium; and (2) review the common pathologies of pregnancy and puerperium that may be relevant to de novo headache, with focus on the first and second trimester. We obtained the literature through a search of PubMed and references of the retrieved publications, without time limit. Results: Aneurysmal subarachnoid hemorrhage and idiopathic intracranial hypertension occur at the same rate during pregnancy and puerperium as otherwise, but symptomatic intracranial hypertension due to dural venous-sinus thrombosis is increased during the third trimester and puerperium. Stroke occurrence, whether arterial or venous, does not seem increased during pregnancy and puerperium but when stroke does occur, it is mostly during the third trimester and puerperium. Immediate postpartum headache is commonly either tension- type headache or migraine; when due to spinal-fluid hypovolemia, apart from epidural or spinal anesthesia, a labor-related dural tear should be considered. Of the medical conditions associated with pregnancy, hypothyroidism, anemia, and hypertension may have to be considered as possible causes of de novo headache. Conclusion: De novo headache during pregnancy is relatively common and almost always leads to neurological referral.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Neurologist](#)

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**Title:** Endovascular management of intracranial aneurysms during pregnancy in three cases and review of the literature.

**Citation:** Interventional neuroradiology : journal of peritherapeutic neuroradiology, surgical procedures and related neurosciences, Dec 2015, vol. 21, no. 6, p. 654-658, 1591-0199 (December 2015)

**Author(s):** Liu, Peng, Lv, Xianli, Li, Youxiang, Lv, Ming

**Abstract:** We present three cases of cerebral aneurysms (1 unruptured; 2 ruptured) treated with endovascular techniques in pregnancies. The first ruptured case is a 28-year-old female on 20th gestational week. After the endovascular coiling, the patient suffered persistent hemiparesis and delivered a healthy baby by cesarean section. The second ruptured case is a 25-year-old female on 36th week of pregnancy. She died of aneurysm re-rupture after delivery of a healthy baby by cesarean section. The third unruptured case is a 31-year-old

woman on the 26th gestational week of pregnancy who died of a giant basilar tip aneurysm after stent-assisted coiling. Ruptured aneurysm obliteration should be prioritized followed by vaginal delivery or cesarean section. The decision regarding the treatment of unruptured aneurysms should be carefully considered on a case-by-case basis. Stent-assisted coiling may be applicable to aneurysm during pregnancy. © The Author(s) 2015.

**Source:** Medline

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**Title:** Subarachnoid hemorrhage during pregnancy

**Citation:** Journal of Perinatal Medicine, October 2015, vol./is. 43/(no pagination), 0300-5577 (October 2015)

**Author(s):** De Motta Rodriguez A., De Mingo Romanillos L., Sanchez Millan V., Manzanares Hipolito F., Guedea D.

**Language:** English

**Abstract:** We report a case of a 30-year-old woman at 29 weeks gestation with a subarachnoid hemorrhage who arrived in emergency room of our hospital reporting a sudden and severe headache accompanied by vomiting and followed by transient loss of consciousness. Magnetic resonance scans was used for diagnosis. After consulting with the attending neurosurgeon, the patient elected to undergo endovascular treatment and a rapid transit microcatheter (cordis miami lakes, fl) was placed. Pregnancy is a recognized risk factor for aneurysmal subarachnoid hemorrhage (sah). The incidence of sah in pregnancy or the puerperium varies from 2 to 7 per 100.000 Deliveries, a risk calculated as 5 times higher than outside the pregnancy period. Non-traumatic sah may account for 5-10 of all maternal deaths in pregnancy and is described as the third most common cause of nonobstetric death in pregnant women. Headache is very frequent in normal pregnancy and it is a common sign shared between several intracranial diseases. Delay in diagnosis may result in a poor outcome. There is a association between pregnancy and risk of stroke. Data suggest that a timely diagnosis and appropriate treatment is essential for mother and fetus.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

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**Title:** A rare cause of headache during pregnancy pose of a clinical case

**Citation:** Journal of Perinatal Medicine, October 2015, vol./is. 43/(no pagination), 0300-5577 (October 2015)

**Author(s):** Neves Amaral F., Nunes F., Marques I., Almeida M.C.

**Language:** English

**Abstract:** Introduction: The rupturing of a brain aneurysm hardly ever happens during pregnancy and can be easily confused with preeclampsia/eclampsia. Pre-eclampsia/eclampsia are frequent events during pregnancy, and one of the most common symptoms is headache, which can be associated with high blood pressure. This case shows why it is so important to take into account different diagnoses in face of headache during hypertensive pregnancy. Clinical case 38-year old female, 38w5d pregnant, with essential AHT, treated with nifedipine CR 30mg, who turned to the ER due to a faint spell followed by occipital headache and vomiting. BP was 143/95 mmHg and urine test strip showed moderate proteinuria, wherefore an analytical analysis was conducted, but did not reveal any changes. The patient was hospitalised as pre-eclampsia was suspected. During the following 8 hours, as the headaches, vomiting and changes in awareness (sleep-wake) did not pass, the patient was referred to Neurology. Neurological examination did not show focal deficit. Cranialcephalic MRI was performed, showing subarachnoid haemorrhage (SAH), hydrocephalus of the supratentorial ventricular system, with haemorrhagic and ischemic areas, probably demonstrating ruptured aneurysm (confirmed by angio-MRI: cerebral aneurysm of the right middle artery). The patient underwent emergency cesarean, and aneurysm clip immediately afterwards. The patient remained in the hospital for 28 days and was discharged without neurological deficitS. The newborn is healthy. Discussion Rupture of a cerebral aneurysm during pregnancy is a rare yet serious complication, with a high rate of maternal morbimortality and is a challenge for obstetricians, neurosurgeons and anesthesiologists. Transitory hypertension and proteinuria are not rare in SAH. The high degree of suspicion lead to early diagnosis and quick management of the event, which resulted in a positive outcome.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

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**Title:** Sudden neurologic decline during cesarean section: A rare presentation of subarachnoid hemorrhage

**Citation:** Journal of Neurosurgical Anesthesiology, October 2015, vol./is. 27/4(436), 1537-1921 (October 2015)

**Author(s):** Harper A., Perkerson J., Langdon R.

**Language:** English

**Abstract:** Introduction: Neurologic decline during pregnancy has a broad differential diagnosis. Eclampsia-related seizures are most common, but other etiologies should be considered. This case report details the presentation of subarachnoid hemorrhage (SAH) from a ruptured aneurysm during a cesarean section. Case Report: A healthy 29-year-old G2P1 Caucasian female at 36 weeks gestational age presented in active labor and was scheduled for repeat cesarean section. The patient received a spinal anesthetic and the infant was delivered without complication. However, during fascial closure, the patient

became suddenly obtunded with agonal respirations and was emergently intubated. Emergent CT of the head demonstrated diffuse high grade SAH suspicious for aneurysmal rupture. Initial angiogram to follow revealed no aneurysm or other source of SAH. A repeat angiogram was performed on post bleed day 3 due to high clinical suspicion and demonstrated a 2.5mm aneurysm in the distal left anterior cerebral artery. Unfortunately, coiling was unsuccessful due to cessation of flow in the parent artery. Due to the high risk of re-rupture, the patient was taken to the OR for clip ligation of the aneurysm. She was discharged from the ICU three weeks later with minimal neurologic deficits. Discussion: The incidence of SAH is highest during the delivery and postpartum period of pregnancy and there is some evidence that the incidence of pregnancy-related SAH is increasing (6.3-13.8 per 100,000 deliveries).<sup>1,2</sup> Risk factors for SAH in pregnancy include pre-eclampsia, eclampsia, increasing age, African-American race, cesarean section, smoking, thrombocytopenia, systemic lupus erythematosus, sickle cell disease, and others. Important etiologies to consider in the setting of SAH include ruptured cerebral aneurysm (saccular and mycotic), dural venous thrombosis, arterial vascular malformations, and pial vessel rupture secondary to hypertensive disorders of pregnancy.<sup>1</sup> SAH in the peripartum period is less likely to be the result of aneurysm rupture than SAH occurring in the non-pregnant patient and SAH associated with aneurysm rupture is typically associated with a higher mortality rate than non-aneurysmal SAH.<sup>1</sup> Conclusion: SAH is a rare but important etiology to consider in the peripartum period in the setting of sudden neurologic decline.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Journal of Neurosurgical Anesthesiology](#)

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**Title:** Integrative management of bilateral ophthalmic artery aneurysms and subarachnoid hemorrhage in pregnancy

**Citation:** Journal of Neurosurgical Anesthesiology, October 2015, vol./is. 27/4(429), 1537-1921 (October 2015)

**Author(s):** Choudhury N., McDonagh D.

**Language:** English

**Abstract:** Introduction: 40 year old female, G4P2A1 at 33w4d presents with acute onset of a headache described as the "worst headache of her life" with associated photophobia and vomiting. On admission, she reports good fetal movement, vital signs are normal and physical exam without focal deficits. A stat CT head reveals a subarachnoid hemorrhage. Emergent diagnostic cerebral angiography reveals bilateral ophthalmic aneurysms, 7-5mm on the left suggestive of a rupture site and the source of bleeding. There is a 5mm aneurysm on the right ophthalmic artery. The patient tolerated an emergent coiling embolization of the left ophthalmic artery aneurysm. Interventions for the right aneurysm are planned postdelivery. Patient's post-operative course is complicated by severe arachnoiditis



requiring scheduled NSAIDs which result in oligohydramnios. On follow-up, the patient reports worsening visual acuity. Three weeks later, the patient undergoes an uncomplicated ASAP cesarean section with close monitoring by neurosurgery. Two months later, the patient undergoes a scheduled, right sided pterional craniotomy for surgical clipping for her right ophthalmic artery aneurysm. Patient has no post-operative complications. Anesthesia Technique: General anesthesia for both aneurysm procedures. Abdominal shielding and fetal monitoring was employed during her first procedure. The patient was kept under very tight BP control. Discussion: The prevalence of intracranial aneurysms (IA) during pregnancy is 2.3%<sup>3</sup> while the reported incidence of subarachnoid hemorrhage (SAH) from aneurysmal rupture is 5.8 per 100,000<sup>2</sup>. SAH from aneurysmal rupture is a major contributor to maternal (35%) and fetal mortality (17%) during pregnancy.<sup>2</sup> Previously, the risk of SAH from an IA during pregnancy and delivery were unclear, Kim et al recently reported the risk of aneurysmal rupture to be 1.4% during pregnancy and 0.05% during delivery - a risk comparable to rupture in the general population.<sup>2</sup> The management of a SAH in pregnancy is a multidisciplinary approach, based largely on neurologic criteria. While surgical, anesthetic and radiation exposure risks are considerations, early aneurysmal intervention during pregnancy improves outcome and reduces mortality rate by half.<sup>1</sup> The common concern is prolonged radiation exposure during coil embolization but the absorbed fetal dose during embolization ranges from 0.17-2.8mGy.<sup>0.3</sup> In actuality, the greatest risks incurred during surgical embolization is heparin utilization which increase bleeding risk during spontaneous labor and risks due to difficulties of performing emergent obstetric delivery in an unfamiliar angiographic suite. This patient's unique presentation required a tailored, multidisciplinary management over the course of 6 months to ensure both maternal and fetal well-being.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Journal of Neurosurgical Anesthesiology](#)

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**Title:** Diagnosing and managing peripartum headache.

**Citation:** Proceedings (Baylor University. Medical Center), Oct 2015, vol. 28, no. 4, p. 463-465, 0899-8280 (October 2015)

**Author(s):** Grant, Erica N, Wang, Jia, Gelpi, Brian, Wortman, Alison, Tao, Weike

**Abstract:** A 38-year-old gravida 7 para 5 Hispanic woman at 36 weeks and 4 days gestation presented with a postpartum headache following vaginal delivery complicated by an unintentional dural puncture for epidural analgesia. Due to the positional nature of the headache and its frontal and occipital origin, a postdural puncture headache was diagnosed. After failure of conservative treatment, an epidural blood patch was used, which offered immediate relief. However, shortly following the procedure, the parturient's neurological condition deteriorated due to an unrecognized intraparenchymal and subarachnoid

hemorrhage requiring an emergent craniectomy. This case highlights the importance of diligence when evaluating and treating postpartum headache despite a classic presentation.

**Source:** Medline

**Full Text:**

Available from *National Library of Medicine* in [Proceedings](#)

Available from *ProQuest* in [Baylor University Medical Center. Proceedings](#)

Available from *National Library of Medicine* in [Proceedings](#)

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**Title:** CEREBRAL ANEURISMAL RUPTURE WITH SUBARACHNOID HEMORRHAGE DURING PREGNANCY: A CASE REPORT.

**Citation:** Le Journal me´dical libanais. The Lebanese medical journal, Oct 2015, vol. 63, no. 4, p. 228-231, 0023-9852 (2015 Oct-Dec)

**Author(s):** Atallah, David, Mansour, Fersan, Samaha, Elie, El Kassis, Nadine, Nassif, Joseph

**Abstract:** Intracranial hemorrhage due to arteriovenous malformation or intracranial aneurysm is a rare but severe complication of pregnancy with maternal and fetal mortality of 20% and 33% respectively. Whether to deliver the patient first, or to treat the aneurysm first is still controversial, but an emergency cesarean section followed by aneurysmal treatment appears to be a widely accepted strategy in pregnant women with cerebral aneurysmal complications. A 38-year-old patient, G3P2A0, presented at 36 gestational weeks with a diffuse bilateral subarachnoid hemorrhage with fourth ventricle bleeding and hydrocephalus. She had a cerebral aneurysm of the left posterior communicating artery on arteriography. A cesarean section was performed on the first day of admission, and an external ventricular derivation with clipping of the aneurysm on the left posterior communicating artery were done immediately after the cesarean section. Mother and newborn were discharged from hospital in a good health status except Broca's aphasia in the mother. In the absence of categorical recommendations, we stress the role of combined care by both neurosurgeons and obstetricians, on a case to case basis according to gestational age, mother neurological status and experience of caregivers.

**Source:** Medline

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**Title:** Patient Characteristics and Outcomes After Hemorrhagic Stroke in Pregnancy.

**Citation:** *Circulation. Cardiovascular quality and outcomes*, Oct 2015, vol. 8, no. 6 Suppl 3, p. S170., 1941-7705 (October 2015)

**Author(s):** Leffert, Lisa R, Clancy, Caitlin R, Bateman, Brian T, Cox, Margueritte, Schulte, Phillip J, Smith, Eric E, Fonarow, Gregg C, Schwamm, Lee H, Kuklina, Elena V, George, Mary G

**Abstract:** Hospitalizations for pregnancy-related stroke are rare but increasing. Hemorrhagic stroke (HS), ie, subarachnoid hemorrhage and intracerebral hemorrhage, is more common

than ischemic stroke in pregnant versus nonpregnant women, reflecting different phenotypes or risk factors. We compared stroke risk factors and outcomes in pregnant versus nonpregnant HS in the Get With The Guidelines-Stroke Registry. Using medical history or International Classification of Diseases-Ninth Revision codes, we identified 330 pregnant and 10 562 nonpregnant female patients aged 18 to 44 years with HS in Get With The Guidelines-Stroke (2008-2014). Differences in patient and care characteristics were compared by  $\chi^2$  or Fisher exact test (categorical variables) or Wilcoxon rank-sum (continuous variables) tests. Conditional logistic regression assessed the association of pregnancy with outcomes conditional on categorical age and further adjusted for patient and hospital characteristics. Pregnant versus nonpregnant HS patients were younger with fewer pre-existing stroke risk factors and medications. Pregnant versus nonpregnant subarachnoid hemorrhage patients were less impaired at arrival, and less than half met blood pressure criteria for severe preeclampsia. In-hospital mortality was lower in pregnant versus nonpregnant HS patients: adjusted odds ratios (95% CI) for subarachnoid hemorrhage 0.17 (0.06-0.45) and intracerebral hemorrhage 0.57 (0.34-0.94). Pregnant subarachnoid hemorrhage patients also had a higher likelihood of home discharge (2.60 [1.67-4.06]) and independent ambulation at discharge (2.40 [1.56-3.70]). Pregnant HS patients are younger and have fewer risk factors than their nonpregnant counterparts, and risk-adjusted in-hospital mortality is lower. Our findings suggest possible differences in underlying disease pathophysiology and challenges to identifying at-risk patients. © 2015 American Heart Association, Inc.

**Source:** Medline

**Full Text:**

Available from *Ovid* in [Circulation: Cardiovascular Quality and Outcomes](#)

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**Title:** Cerebrovascular emergencies in pregnancy

**Citation:** Best Practice and Research: Clinical Obstetrics and Gynaecology, July 2015, vol./is. 29/5(721-731), 1521-6934;1532-1932 (01 Jul 2015)

**Author(s):** Shinker S.A., Edlow J.A., O'Brien K.

**Language:** English

**Abstract:** Caring for pregnant and postpartum patients with neurological disease carries specific challenges. In performing a diagnosis, it is often difficult to differentiate between true pathology and neurological symptoms resulting from normal pregnancy physiology. Treating the pregnant patient can be problematic as well. Providers need to be aware of the possible untoward effects of maternal treatments on the developing fetus, but not withhold therapies that reduce disease-related morbidity and mortality. Given the complexities of conducting trials during pregnancy, few treatments are based on high-quality data; observational data and clinical expert opinion often guide treatments. With the exception of preeclampsia/eclampsia, neurological diseases typically do not warrant early delivery in the absence of fetal distress. Multidisciplinary care, utilizing the expertise of anesthesiology,

critical care medicine, emergency medicine, maternal-fetal medicine, neurology, and radiology, is essential in ensuring prompt diagnosis and treatment.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Ruptured intracranial aneurysm during pregnancy with false-negative computed tomography angiography findings: a case report.

**Citation:** Emergency radiology, Jun 2015, vol. 22, no. 3, p. 343-346, 1438-1435 (June 2015)

**Author(s):** Goto, Yukihiro, Ebisu, Toshihiko, Mineura, Katsuyoshi

**Abstract:** A 34-year-old female was admitted at 34 weeks of gestation with sudden onset of a severe headache accompanied by vomiting. Neurological examination revealed neck rigidity, and computed tomography (CT) of the brain revealed a subarachnoid hemorrhage (SAH). Although the hemorrhage was located primarily in the left Sylvian fissure, computed tomography angiography (CTA) performed immediately after CT did not reveal any obvious vascular abnormalities such as an intracranial aneurysm. An emergency cesarean section was performed, and a healthy infant was delivered. Cerebral digital subtraction angiography (DSA) was performed the day following surgery, which revealed a saccular aneurysm measuring 4.3 mm × 2.4 mm in the left middle cerebral artery. Left craniotomy and clipping of the aneurysm were performed. The clot around the aneurysm was relatively solid. This case report is of significance given that initial CTA was negative for SAH during pregnancy, suggesting the requirement for immediate DSA or another CTA in such cases. There are many previous reports on false-negative CTA findings or disappearance and reappearance of aneurysms in SAH patients, and various biophysical and dynamic parameters are suggested to cause such phenomena. However, there are no reports on similar occurrences during pregnancy. Although the precise cause remains unclear, multiple factors associated with homeostasis during pregnancy were possibly associated with the transient disappearance in this patient.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Emergency Radiology](#)

Available from *ProQuest* in [Emergency Radiology](#)

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**Title:** "One-shot" endovascular management of cerebral aneurysm and fourth ventricle hemangioblastoma in a pregnant woman.

**Citation:** International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics, Apr 2015, vol. 129, no. 1, p. 79-80, 1879-3479 (April 2015)

**Author(s):** Surico, Daniela, Amadori, Roberta, Garofalo, Greta, Nuzzi, Nunzio P, Carriero, Alessandro, Surico, Nicola

**Source:** Medline

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**Title:** Reversible cerebral vasoconstriction syndrome: a rare cause of postpartum headache

**Citation:** Practical neurology, April 2015, vol./is. 15/2(141-144), 1474-7766 (01 Apr 2015)

**Author(s):** Wiles K.S., Nortley R., Siddiqui A., Holmes P., Nelson-Piercy C.

**Language:** English

**Abstract:** We describe two women presenting with severe postpartum headache associated with hypertension but with no other signs or investigation results to suggest pre-eclampsia. In one case, the headache was associated with atypical subarachnoid haemorrhage. The variable nature of the headache and the degree of associated hypertension raised the clinical suspicion of reversible cerebral vasoconstriction syndrome, confirmed on MR angiography. Both patients took nimodipine until the cerebral vasoconstriction had resolved radiologically.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *HighWire Press* in [Practical neurology](#)

Available from *Free Access Content* in [Practical Neurology](#)

Available from *ProQuest* in [Practical Neurology](#)

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**Title:** Patient characteristics and outcomes in pregnancy-related subarachnoid hemorrhage

**Citation:** Stroke, February 2015, vol./is. 46/(no pagination), 0039-2499 (February 2015)

**Author(s):** Leffert L., Clancy C., Bateman B., Cox M., Schulte P., Smith E., Fonarow G., Schwamm L., George M., Kuklina E.

**Language:** English

**Abstract:** Background: Subarachnoid hemorrhage (SAH) accounts for up to 4.1% of all pregnancy-related in-hospital deaths, but is less often aneurysmal and is associated with better short term outcomes than in non-pregnant patients. We sought to describe the risk factors, management and outcomes of pregnant vs. non-pregnant patients with SAH in the Get With The Guidelines (GWTG) Stroke Registry Methods: Using medical history or ICD-9 codes, we identified 152 pregnant and 5745 non-pregnant SAH female patients aged 18-44 with SAH in GWTG from 2008-2013. Differences in characteristics were compared by Chi-

square tests for categorical and Wilcoxon Rank-Sum tests for continuous variables. Stratified logistic regression assessed the effect of pregnancy on outcomes conditional on age and adjusted for patient and hospital characteristics Results: Pregnant SAH patients were younger, more often black and insured with Medicaid. They had higher initial blood pressure (BP) and were less likely to report prior hypertension. Arrival delays from stroke onset were common in both groups (median 340 vs. 277 min), but pregnant SAH patients were more often already hospitalized at stroke onset (16% vs. 10%). Fewer pregnant vs. non-pregnant SAH patients had initial neurologic exam findings recorded (Table). Pregnant SAH patients had lower in-hospital death than non-pregnant patients (aOR 0.17, 95% CI 0.06-0.45) and were more likely at discharge to ambulate independently (aOR 2.40, 95% CI 1.56-3.69) and return home (aOR 2.60, 95% CI 1.67-4.06) Conclusions: Several differences exist between pregnant and non-pregnant women with SAH. Many present with BP well below the threshold for hypertensive disorders of pregnancy, making prompt recognition and prevention of brain hemorrhage challenging. Overall, pregnancy-related SAH is associated with less morbidity and mortality than non-pregnancy related disease.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Stroke](#)

Available from *Ovid* in [Stroke](#)

Available from *Ovid* in [Stroke.](#)

Available from *Highwire Press* in [Stroke](#)

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**Title:** Cerebralaneurismal rupture with subarachnoid hemorrhage during pregnancy: A case report

**Citation:** Journal Medical Libanais, 2015, vol./is. 63/4(228-231), 0023-9852 (2015)

**Author(s):** Atallah D., Mansour F., Samaha E., El Kassis N., Nassif J.

**Language:** English

**Abstract:** Background: Intracranial hemorrhage due to arteriovenous malformation or intracranial aneurysm is a rare but severe complication of pregnancy with maternal and fetal mortality of 20% and 33% respectively. Whether to deliver the patient first, or to treat the aneurysm first is still controversial, but an emergency cesarean section followed by aneurismal treatment appears to be a widely accepted strategy in pregnant women with cerebral aneurysmal complications. Case: A 38-year-old patient, G3P2A0, presented at 36 gestational weeks with a diffuse bilateral subarachnoid hemorrhage with fourth ventricle bleeding and hydrocephalus. She had a cerebral aneurysm of the left posterior communicating artery on arteriography. A cesarean section was performed on the first day of admission, and an external ventricular derivation with clipping of the aneurysm on the left posterior communicating artery were done immediately after the cesarean section. Mother and newborn were discharged from hospital in a good health status except Broca's

aphasia in the mother. Conclusion: In the absence of categorical recommendations, we stress the role of combined care by both neurosurgeons and obstetricians, on a case to case basis according to gestational age, mother neurological status and experience of caregivers.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Uncommon stroke disorders clinical and radiologic characteristics in pres/rcvs at pregnant and postpartum period

**Citation:** International Journal of Stroke, October 2014, vol./is. 9/(313-314), 1747-4930 (October 2014)

**Author(s):** Ito Y., Moriyoshi H., Ogura A., Nakai N., Nishida S., Yasuda T.

**Language:** English

**Abstract:** Introduction and aims: Pres (posterior reversible encephalopathy syndrome) and RCVS (reversible cerebral vasoconstriction syndrome) are often recognized in pregnancy and puerperal period. Vasogenic edema is thought to be the main pathologic feature in PRES and in contrast, cerebral vasoconstriction in RCVS. To clarify characteristics of PRES and RCVS in pregnancy, the puerperal period. Subject and methods: We examined 24 pregnancy/puerperal related women with neuroradiologic evaluation by cranial MRI/MRA, cerebral angiography and SPECT. Twenty four patients included 3 pregnancy-induced hypertension, 15 eclampsia and 6 post partum angiopathy. Results: Convulsions was the predominating symptoms (75%), following headache (67%), visual disturbances (29%) and thunderclap headache was recognized only in 2 patients (8%). Radiologically, PRES and RCVS were merged in 16 cases. In addition to PRES and RCVS, cerebral hemorrhage (1), subcortical subarachnoid hemorrhage (1), subdural hematomas (1), cerebral infarction (5) and reversible splenial lesion (1) was shown in acute phase. In 6 of 16 PRES/RCV mergers, vasoconstriction was recognized after brain edema has disappeared and it persisted for from several days to several months. As for the clinical outcome 3 months later was almost good: Mrs 0 (22), 3 (1) and 6 (1). However, the image findings 3 months later showed an irreversible change in 21% including old cerebral hemorrhage (1) and infarction (5). Conclusions: Convulsions and headache was the main symptoms of PRES/RCVS but it rarely develops for the thunder headache. Clinical outcome is generally good however, "irreversible" radiologic findings such as bleeding or infarction is often recognized.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

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**Title:** The incidence of neurological events during pregnancy requiring neurointensive care in the east of England: Our experience

**Citation:** Intensive Care Medicine, September 2014, vol./is. 40/1 SUPPL. 1(S190-S191), 0342-4642 (September 2014)

**Author(s):** Robba C., Sekhon M.S., Outtrim J., Bertuccio A., Matta B.

**Language:** English

**Abstract:** INTRODUCTION. Neurocritical care diseases such as cerebrovascular events, eclampsia, preeclampsia, neuropathy, myopathy and intracranial hemorrhage can complicate pregnancy. Due to the complexities of neurocritical care illness with concomitant pregnancy, little is known regarding the incidence, presentations, diagnosis, optimal management strategies and outcomes in these patients. OBJECTIVE. We describe a consecutive case series of pregnant patients whom presented to our neurocritical care unit and discuss the presentations, diagnoses as well as management of neurocritical care diseases in pregnancy. METHODS. We described 38 women neurocritically ill pregnant patients aged 17 to 39 years admitted to our unit at Addenbrookes Hospital, Cambridge, from 2009 to 2014. Nine were excluded because the admission diagnosis was not primarily neurological in origin. Of the 29 patients included, we recorded baseline demographics, symptoms of presentation, state of pregnancy, management, treatment and outcomes (GOS and mortality at discharge). RESULTS. Loss of consciousness, seizure and headache were the most common presenting symptoms. More than half of cases occurred in the third trimester of pregnancy or peripartum. Of the 29 patients admitted, 17(58.6 %) patients had vascular intracranial events (stroke, hemorrhage, aneurysmal disease). Of these, 14 (48.3 %) patients had an intracranial hemorrhage (5 non traumatic subarachnoid hemorrhage, 9 intracranial hemorrhage), and 3 (10,3 %) were associated with cerebral venous sinus thrombosis. Four patients were admitted secondary to trauma (13,8 %), and only 3 (10.3 %) patients were admitted for eclampsia. Other causes (meningitis, brain tumors, respiratory failure,) were less common. 3 of the 29 (10.3 %) patients included died. Of the 26 patients who survived (89,7 %), 24 were neurologically improved at the discharge, and 2 had no neurological deficits. DISCUSSION. Neurological disorders during pregnancy result from a wide range of etiologies, and the management can be challenging. The management (surgical, medical or supportive) should be evaluated according to the state of pregnancy, general conditions and risk factors for the patient and for the child and after a multidisciplinary assessment that should involve neurologists, neurosurgeons, obstetrics and intensivists.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *ProQuest* in [Intensive Care Medicine](#)

Available from *Springer Link Journals* in [Intensive Care Medicine](#)

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**Title:** Subdural hygroma accompanied by parenchymal and subarachnoid haemorrhage after epidural analgesia in an obstetric patient



**Citation:** Acta Anaesthesiologica Scandinavica, August 2014, vol./is. 58/7(897-902), 0001-5172;1399-6576 (August 2014)

**Author(s):** Del-Rio-Vellosillo M., Garcia-Medina J.J., Fernandez-Rodriguez L.E., Martin-Gil-Parra R., Lopez-Perez J., Almagro-Navarro M.J.

**Language:** English

**Abstract:** Background Anaesthetists need to know the different causes of persistent headache or a change in level of consciousness following epidural analgesia for labour. Failure to recognise these neurological complications can lead to delayed diagnoses, with subsequent serious implications. Methods We present a patient who was re-admitted for postural headache resulting from an unrecognised dural puncture during an epidural for pain relief while in labour. During the interview, the patient confirmed drug use (cocaine), so she was evaluated by a psychiatrist with possible post-partum psychosis or drug withdrawal syndrome. Afterwards, the patient deteriorated neurologically, showing impaired consciousness and seizures. Results The cranial computed tomography showed bilateral frontoparietal subdural collections with intraparenchymal and subarachnoid haemorrhaging. She improved by burr hole drainage of subdural hygroma and a blood patch. Conclusions Neurological signs should alert the clinician to the possibility of subdural collection and other possible complications such as sinking of the brain in order not to delay the request for imaging tests for diagnoses and effective treatments. © 2014 The Acta Anaesthesiologica Scandinavica Foundation. Published by John Wiley & Sons Ltd.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *John Wiley and Sons* in [Acta Anaesthesiologica Scandinavica](#)

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**Title:** Endovascular Treatment of a Ruptured Posterior Inferior Cerebellar Artery Aneurysm during Pregnancy.

**Citation:** Journal of Korean Neurosurgical Society, May 2014, vol. 55, no. 5, p. 273-276, 2005-3711 (May 2014)

**Author(s):** Kim, Ki Dae, Chang, Chul Hoon, Choi, Byung Yon, Jung, Young Jin

**Abstract:** Aneurysmal subarachnoid hemorrhage (SAH) during pregnancy is quite rare, however it has a high maternal mortality rate. A pregnant woman in the 16th gestational week was admitted to our hospital with a drowsy level of consciousness. A brain magnetic resonance (MR) image showed hemorrhage on the prepontine cistern, and both sylvian fissures, and MR angiography and cerebral digital subtraction angiography demonstrated an aneurysm at the left posterior inferior cerebellar artery (PICA). We performed endovascular coil embolization attempting to minimize radiation exposure. She was discharged with no neurologic deficit and delivered a healthy baby by cesarean section at the 38th week of

gestation. This case study reported the shortest gestational period and this is the first report on an aneurysmal rupture arising from PICA which was treated using an endovascular method. Using an appropriate technique for reduced radiation exposure to the fetus and limited alterations in maternal-fetal physiology, endovascular coil embolization could guarantee good results in treatment of aneurysmal SAH in pregnant women.

**Source:** Medline

**Full Text:**

Available from *National Library of Medicine* in [Journal of Korean Neurosurgical Society](#)

Available from *National Library of Medicine* in [Journal of Korean Neurosurgical Society](#)

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**Title:** Cerebrovascular events occurring after hospital discharge for labor and delivery

**Citation:** Stroke, February 2014, vol./is. 45/(no pagination), 0039-2499 (February 2014)

**Author(s):** Sriram N., Hovsepian D.A., Kamel H., Navi B.B.

**Language:** English

**Abstract:** Introduction: Stroke and other cerebrovascular events (CVE) are feared complications of pregnancy. Prior studies have reported an increased risk of CVE during the postpartum period, but these studies have not reported event rates after hospital discharge for labor and delivery. Methods: We performed a retrospective cohort study using the California State Inpatient and Emergency Department administrative databases to identify all pregnant women who went into labor at a non-federal, acute-care hospital from 2005 through 2011 and who were discharged without an ICD-9-CM diagnosis of cerebrovascular disease. The primary outcome was a CVE composite defined as any ischemic stroke, intracerebral hemorrhage, subarachnoid hemorrhage, subdural hemorrhage, cerebral sinus thrombosis, pituitary apoplexy, cerebral artery dissection, or hypertensive encephalopathy, occurring after hospital discharge and prior to 6 weeks after admission for labor and delivery. Descriptive statistics were used to calculate the incidence of postpartum CVE after hospital discharge and multivariate logistic regression was used to evaluate the association between several a priori selected clinical factors and postpartum CVE. Results: A total of 2,065,330 patients were included in this analysis. The rate of any CVE was 9.97 per 100,000 patients (95% CI 8.61-11.3). The mortality rate in patients with CVE was 7.8% (95% CI 4.1-11%). The mean age of patients with a CVE was 31.0 years as compared to 28.3 years in patients without a CVE ( $p < 0.001$ ). Risk factors for any CVE were eclampsia (OR 19.9, 95% CI 6.43-61.4), chronic kidney disease (OR 3.88, 95% CI 1.02-14.8), black race (OR 3.19, 95% CI 2.26-4.50), preeclampsia (OR 2.67, 95% CI 1.99-3.59), and age (OR 1.07 per year, 95% CI 1.05-1.09). Conclusion: The incidence of postpartum CVE after hospital discharge for labor and delivery is similar to rates reported for all postpartum events in prior publications. This suggests that a substantial proportion of postpartum cerebrovascular complications occur after hospital discharge. Therefore, clinicians should be aware that postpartum women remain at risk for stroke even if they have been discharged from their initial labor and delivery hospitalization without complication.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Stroke](#)

Available from *Ovid* in [Stroke](#)

Available from *Ovid* in [Stroke.](#)

Available from *Highwire Press* in [Stroke](#)

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**Title:** Severe subarachnoid hemorrhage associated with cerebral venous thrombosis in early pregnancy: A case report

**Citation:** Journal of Emergency Medicine, December 2013, vol./is. 45/6(849-855), 0736-4679 (December 2013)

**Author(s):** Yamamoto J., Kakeda S., Takahashi M., Idei M., Nakano Y., Soejima Y., Saito T., Akiba D., Shibata E., Korogi Y., Nishizawa S.

**Language:** English

**Abstract:** Background Cerebral venous thrombosis (CVT) rarely induces subarachnoid hemorrhage (SAH). During late pregnancy and puerperium, CVT is an uncommon but important cause of stroke. However, severe SAH resulting from CVT is extremely rare during early pregnancy. Objective We report on a rare case of severe SAH due to CVT, and discuss the potential pitfalls of CVT diagnosis in early pregnancy. Case Report A 32-year-old pregnant woman (9th week of pregnancy) presented with slight head dullness. Initial magnetic resonance imaging (MRI) revealed focal, abnormal signal intensity in the left thalamus. Nine days later, the patient developed a generalized seizure and severe SAH was detected with computed tomography (CT) scan. MRI and cerebral angiography revealed a completely thrombosed superior sagittal sinus, vein of Galen, straight sinus, and right transverse sinus. Transvaginal sonography indicated a missed abortion. The day after admission, the patient presented again with a progressive loss of consciousness and signs of herniation. The patient underwent emergency decompressive craniotomy, followed by intrauterine curettage. Two months later, she made an excellent recovery except for a slight visual field defect. Conclusions A rare case of severe SAH due to CVT is reported, with emphasis on the potential pitfalls of CVT diagnosis in early pregnancy. Copyright © 2013 Elsevier Inc. Printed in the USA. All rights reserved.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Postpartum cerebral angiopathy presenting with non-aneurysmal subarachnoid hemorrhage and interval development of neurological deficits: a case report and review of literature.

**Citation:** Neurology India, Sep 2013, vol. 61, no. 5, p. 517-522, 0028-3886 (2013 Sep-Oct)

**Author(s):** Yang, Li, Bai, Harrison X, Zhao, Xin, Xiao, Yanqiao, Tan, Liming

**Abstract:** Postpartum cerebral angiopathy (PCA) is a cerebrovascular disease that occurs during the postpartum period. It is characterized by reversible multifocal vasoconstriction of the cerebral arteries. We report a patient with PCA proven by cerebral angiography that revealed multifocal, segmental narrowing of the cerebral arteries and non-aneurysmal subarachnoid hemorrhage. The patient suddenly deteriorated with focal neurological deficits on the 5 th day of hospitalization. She was treated with calcium-channel blockers and monitored with daily transcranial Doppler ultrasound. Her symptoms gradually improved and she was discharged on the 11 th day of hospitalization. At 1-month follow-up, patient was completely symptom-free with no neurological deficits.

**Source:** Medline

**Full Text:**

Available from *Free Access Content* in [Neurology India](#)

Available from *ProQuest* in [Neurology India](#)

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**Title:** The diagnosis and treatment of a patient with subdural hygroma accompanied by parenchymal and subarachnoid hemorrhage after epidural analgesia

**Citation:** Regional Anesthesia and Pain Medicine, September 2013, vol./is. 38/5 SUPPL. 1(E256-E257), 1098-7339 (September-October 2013)

**Author(s):** Del-Rio-Vellosillo M., Garcia-Medina J.J., Martin-Gil-Parra R., Abengochea-Cotaina A., Barbera-Alacreu M., Acosta-Villegas F.

**Language:** English

**Abstract:** Purpose/Objective: We describe a patient with an unrecognised dural puncture after epidural analgesia who was treated for psychiatry and who was later diagnosed with a subdural hygroma accompanied by parenchymal and subarachnoid hemorrhaging. Materials and Methods: A 34-year-old Czech woman, at gestation week 35 who was admitted into hospital for labour. She had epidural analgesia without complications and she underwent an uneventful vaginal delivery. On day 2 after delivery, the patient developed postdural puncture headache (PDPH) and improved with rest, fluids and analgesia. Eight days after the lumbar puncture, she was re-admitted for PDPH, confused behaviour and was diagnosed by a psychiatrist with possible puerperal psychosis or drug withdrawal syndrome. The next day, she developed a severe holocraneal headache, paresthesias, felt drowsy, seizures, proceeding to intubation. The cranial-computed tomography (CCT) showed subdural hygroma, parenchymal and subarachnoid hemorrhaging. A surgical intervention was decided. After she was extubed a blood patch was performed for persistent PDPH. A spinal magnetic resonance imaging (MRI) checked the absence of a cerebrospinal fluid (CSF) leak. Finally she was discharged after a 12-day hospital stay. Results: The PDPH after dural

puncture is not the only cause of headache in pregnancy. Headache in pregnancy also includes preeclampsia, migraine, drug-induced headache and intracranial pathologies. Intracranial pathologies include subdural hygromas and haematomas, intracerebral haemorrhaging and venous sinus thrombosis. Conclusions: Anesthetists need to know the different causes of headache in pregnancy. Failure to recognise these neurological complications after persistent headaches and altered consciousness following epidural analgesia can lead to delayed diagnoses, with subsequent serious implications.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Regional Anesthesia and Pain Medicine](#)

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**Title:** Subarachnoid hemorrhage from intracranial aneurysms during pregnancy and the puerperium

**Citation:** Neurologia Medico-Chirurgica, August 2013, vol./is. 53/8(549-554), 0470-8105;1349-8029 (25 Aug 2013)

**Author(s):** Kataoka H., Miyoshi T., Neki R., Yoshimatsu J., Ishibashi-Ueda H., Iihara K.

**Language:** English

**Abstract:** Subarachnoid hemorrhage (SAH) due to the rupture of an intracranial aneurysm (IA) is a rare but serious complication of pregnancy and is responsible for important morbidity and mortality during pregnancy. This study reviewed reports of ruptured IA during pregnancy and the puerperium, and our own cases of ruptured IA in pregnant women. Hemorrhage occurred predominantly during the third trimester of pregnancy, when maternal cardiac output and blood volume increase and reach maximum. Physiological and hormonal changes in pregnancy are likely to affect the risk of IA rupture. Ruptured IAs during pregnancy should be managed based on neurosurgical considerations, and the obstetrical management of women with ruptured IAs should be decided according to the severity of SAH and the gestational age. Emergent cesarean section followed by clipping or coiling of aneurysms is indicated if the maternal condition and the gestational age allow such interventions. Although SAH during pregnancy can result in disastrous outcomes, the necessity of intracranial screening for high-risk pregnant women is still controversial.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *National Library of Medicine* in [Neurologia medico-chirurgica](#)

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**Title:** Spinal anaesthesia for emergency caesarean section in a parturient with acute subarachnoid haemorrhage

**Citation:** European Journal of Anaesthesiology, June 2013, vol./is. 30/(173), 0265-0215 (June 2013)

**Author(s):** Ng O., Thong S.Y., Goh S.Y.

**Language:** English

**Abstract:** Background: Subarachnoid hemorrhage during pregnancy is rare, estimated to be 0.014%.<sup>(1)</sup> We describe the anaesthetic management of emergency caesarean section in a patient with acute subarachnoid haemorrhage under spinal anaesthesia. Case report: F, a 29 year-old healthy parturient, presented at 37 week gestation with severe headache. She was Glasgow Coma Scale (GCS) 15 without neurological deficit. Computed tomography revealed subarachnoid haemorrhage, without raised intracranial pressure. After a dose of paracetamol for analgesia, patient refused all medications due to the fear of maternal-fetal drug transfer. A multidisciplinary team conferred and after informed consent, planned on an emergency caesarean section prior to further interventional neuroradiological procedures. Spinal anaesthesia for the caesarean section was chosen for the following advantages: avoidance of hypertensive response during intubation and airway manipulation; avoidance of airway management and possible aspiration; and excellent analgesia. Regional anaesthesia allowed continuous monitoring of patient's GCS perioperatively. Spinal anaesthesia was performed uneventfully with hyperbaric bupivacaine 0.5%, 2.3ml and fentanyl 15 mcg. Caesarean section proceeded and patient experienced no discomfort throughout procedure. Preoperative blood pressure and heart rate ranged between 123/68-140/68 mmHg and 78-89 per minute. Intraoperative blood pressure and heart rate were maintained between 105/54-128/64 mmHg and 87-96 per minute. Satisfaction for anaesthesia was high due to good blood pressure control and fetal outcome. Discussion: General anaesthetic management of caesarean section in a parturient with intracranial haemorrhage has been described. However, due to the rarity of the condition, no consensus has been reached with regards to optimal anaesthetic care. Despite the numerous advantages which spinal anaesthesia can offer, the authors did not find any precedent report in literature. In addition to the known risks of spinal anaesthesia, post dural puncture headache (PDPH) may be difficult to diagnose in a patient with existing headache. Worsening headache due to PDPH may confound the evaluation of rebleed in intracranial aneurysm. Our patient did not experience this problem, fortunately. Learning points: In a patient with recent subarachnoid haemorrhage, minimal neurological deficit undergoing emergency caesarean section, spinal anaesthesia offers good haemodynamic control.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [European Journal of Anaesthesiology](#)

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**Title:** A rare case of ruptured cerebral aneurysm in pregnancy

**Citation:** BJOG: An International Journal of Obstetrics and Gynaecology, June 2013, vol./is. 120/(180), 1470-0328 (June 2013)

**Author(s):** Sabnis H., Rajagopalan C.

**Language:** English

**Abstract:** Background The association of cerebral aneurysm and pregnancy is uncommon. Haemodynamic physiology of pregnancy is a crucial factor for the growth of such aneurysms in pregnancy. In the latest maternal mortality triennial report, 11/22 cases of intracranial haemorrhage were due to subarachnoid haemorrhage. Case We report a case of a 31-year-old female, P5, previous all normal deliveries, who was 38 weeks pregnant, late booker, presented with a 13 days history of sudden onset vice like headache, nausea but no vomiting and mild blurring of vision. Clinical and neurological examination was normal with no evidence of neurological deficit. CT scan revealed an aneurysm at the bifurcation of the right middle cerebral artery. She underwent coil embolisation of the ruptured aneurysm. She was delivered by elective caesarean section and was reviewed at a 6 week follow-up visit. Conclusion Literature review was done of similar cases and we have concluded that management decisions are fundamental and should be jointly made between the obstetricians and neurosurgeons in a tertiary unit with consideration of issues of radiation exposure and possible embolisation.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

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

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

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**Title:** Reversible cerebral vasoconstriction syndrome and spontaneous hemorrhage are the most common causes of peripartum subarachnoid and intracerebral hemorrhage

**Citation:** Circulation: Cardiovascular Quality and Outcomes, May 2013, vol./is. 6/3 SUPPL. 1(no pagination), 1941-7705 (May 2013)

**Author(s):** Smit L.J., Song S., Connors J., Cutting S., Lee V.

**Language:** English

**Abstract:** Introduction: Aneurysmal and hypertensive hemorrhages are the most common causes of subarachnoid hemorrhage (SAH) and intracerebral hemorrhage (ICH) in the general population, but the peripartum period has several unique characteristics that

increase the risk of hemorrhage, including expanded plasma volume, increased vascular tone, hypercoagulability and elevation of catecholamines during delivery. Hemorrhagic and ischemic stroke accounts for 12% of all maternal deaths, and is a significant source of morbidity as well. Hypothesis: We hypothesized that peripartum SAH and ICH is due to distinctly different pathophysiologic processes compared to the general population. Methods: We conducted a chart review of inpatient stroke service admissions at a large urban academic center between the years 2006 to 2010 for women under the age of 40 with a diagnosis of SAH or ICH. of those, we identified peripartum patients, determined etiologies for their hemorrhages, and documented pertinent risk factors. Results: Fifty-one patients under the age of 40 were identified with SAH or ICH. of those, eight were peripartum and half were post cesarean section. The two most common etiologies for SAH or ICH were spontaneous hemorrhage, and reversible cerebral vasoconstriction syndrome. Other etiologies included coagulopathy and hypertension/preeclampsia. None of the peripartum hemorrhages were noted to be aneurismal. Conclusions: Etiologies in peripartum SAH and ICH differ from the general population. Aneurysmal bleeds were absent in our case series. Rates of SAH and ICH may be higher in patients who underwent cesarean section. In conclusion, peripartum subarachnoid and intracranial hemorrhages have a different pathophysiologic process than in the general population.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Circulation: Cardiovascular Quality and Outcomes](#)

Available from *Highwire Press* in [Circulation: Cardiovascular Quality and Outcomes](#)

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**Title:** Two patients with subarachnoid hemorrhage in pregnancy

**Citation:** Eastern Journal of Medicine, April 2013, vol./is. 18/2(76-80), 1301-0883 (April - June 2013)

**Author(s):** Gonullu H., Karadas S., Resit Oncu M., Tasdemir M.

**Language:** English

**Abstract:** It has been reported that headache in 50-60% of subarachnoid hemorrhage cases has an abrupt onset and is severe with the cause in the 75-80% of events being intracranial aneurysm rupture. This condition, which is also known as sentinel headache and particularly observed days before the rupture of an aneurysm, is of great importance to clinicians. Subarachnoid hemorrhage is rarely seen in pregnancy; on the other hand, it has a high mortality rate for both mother and fetus. This paper presents the case studies of two pregnant women who were admitted to the hospital with a sentinel headache, abrupt-onset and variable headache complaints, they were consequently diagnosed with subarachnoid hemorrhage.

**Publication Type:** Journal: Article



**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Eastern Journal of Medicine](#)

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**Title:** Anesthetic Approach of Pregnant Woman with Cerebral Arteriovenous Malformation and Subarachnoid Hemorrhage during Pregnancy: Case Report

**Citation:** Revista Brasileira de Anestesiologia, March 2013, vol./is. 63/2(223-226), 0034-7094;1806-907X (March 2013)

**Author(s):** Santos Carvalho C., Resende F., Joao Centeno M., Ribeiro I., Moreira J.

**Language:** English

**Abstract:** Background and objectives: Subarachnoid hemorrhage (SAH) during pregnancy is a rare event, and about half the cases are due to arteriovenous malformations (AVM). The authors describe the anesthetic approach of a 39 week pregnant patient scheduled for cesarean section, with a history of SAH due to AVM at 22 week gestation. Case report: 39 week pregnant patient, healthy prior to pregnancy, with a history of SAH at 22 week gestation, manifested by headache, vomiting, and dizziness without loss of consciousness or other deficits on admission to the emergency room. Magnetic resonance imaging (MRI) revealed a left frontal AVM. After a short hospital stay for stabilization and diagnosis, the final medical decision was to maintain the pregnancy and a multidisciplinary follow-up by neurosurgery and high-risk obstetric consultation. An elective cesarean section was performed at 39 weeks under epidural anesthesia. During the intraoperative period, an episode of hypotension rapidly reversed with phenylephrine occurred. The newborn Apgar score was 10/10. An epidural catheter was used for postoperative analgesia, also uneventful. Conclusions: There are very few published cases of anesthetic approach for pregnant women with symptomatic AVM. All decisions made by the multidisciplinary team, from choosing to continue the pregnancy to the ideal time for AVM intervention and type of anesthesia and analgesia, were weighted according to the risk of brain damage. Regarding the anesthetic procedure, the authors emphasize the need for hemodynamic stability. © 2013 Elsevier Editora Ltda.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Cerebral aneurysms in pregnancy and delivery: pregnancy and delivery do not increase the risk of aneurysm rupture.

**Citation:** Neurosurgery, Feb 2013, vol. 72, no. 2, p. 143, 1524-4040 (February 2013)

**Author(s):** Kim, Young Woo, Neal, Dan, Hoh, Brian L

**Abstract:** It is not known what effect pregnancy or delivery has on the risk of rupture of an intracranial aneurysm, and, consequently, the optimal management of unruptured aneurysms in pregnancy is unclear. To study the effect of pregnancy and delivery on the risk of rupture of intracranial aneurysms and to delineate trends in neurosurgical and obstetric management of pregnant women with intracranial aneurysms. The Nationwide Inpatient Sample data were analyzed for years 1988 to 2009 to estimate the risk of aneurysm rupture during pregnancies and deliveries. We calculated the risk by dividing the observed number of patients with ruptured aneurysm during pregnancy and delivery by the expected number based on the incidence among women of pregnancy age. There were 714 and 172 hospitalizations involving ruptured aneurysms with pregnancy and delivery, respectively. Assuming 1.8% prevalence of unruptured aneurysms among all women of pregnancy age, we estimated that 48,873 women hospitalized for pregnancy and 312,128 women hospitalized for delivery had unruptured aneurysms. The risks of rupture during pregnancy and deliveries were 1.4% (95% confidence interval [CI] = [1.35, 1.57]) and 0.05% (95% CI = [0.0468, 0.0634]), respectively. Of 218 deliveries performed with unruptured aneurysm, 153 were cesarean deliveries (70.18%, 95% CI = [64.06, 76.30%]), suggesting that the rate of cesarean deliveries in patients with unruptured aneurysms is significantly higher than in the general population ( $P < .001$ ). We were not able to find an increased association between pregnancy or delivery and the risk of rupture of cerebral aneurysms. The significantly higher rate of cesarean deliveries performed in patients with unruptured aneurysms may not be necessary.

**Source:** Medline

**Full Text:**

Available from *Ovid* in [Neurosurgery](#).

Available from *Ovid* in [Neurosurgery](#)

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**Title:** Diagnosis of acute neurological emergencies in pregnant and post-partum women

**Citation:** The Lancet Neurology, February 2013, vol./is. 12/2(175-185), 1474-4422;1474-4465 (February 2013)

**Author(s):** Edlow J.A., Caplan L.R., O'Brien K., Tibbles C.D.

**Language:** English

**Abstract:** Acute neurological symptoms in pregnant and post-partum women could be caused by exacerbation of a pre-existing neurological condition, the initial presentation of a non-pregnancy-related problem, or a new acute-onset neurological problem that is either unique to or occurs with increased frequency during or just after pregnancy. Pregnant and postpartum patients with headache and neurological symptoms are often diagnosed with pre-eclampsia; however, a range of other causes must also be considered, such as cerebral venous sinus thrombosis and reversible cerebral vasoconstriction syndrome. Precise diagnosis is essential to guide subsequent management. Our ability to differentiate between the specific causes of acute neurological symptoms in pregnant and post-partum patients is

likely to improve as we learn more about the pathogenesis of these disorders. &#xa9; 2013 Elsevier Ltd.

**Publication Type:** Journal: Review

**Source:** EMBASE

**Full Text:**

Available from *ProQuest* in [Lancet Neurology, The](#)

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**Title:** Maternal outcomes in stroke during pregnancy and puerperium

**Citation:** American Journal of Obstetrics and Gynecology, January 2013, vol./is. 208/1 SUPPL.1(S286), 0002-9378 (January 2013)

**Author(s):** Katsuragi S., Neki R., Yamanaka K., Kamiya C., Miyoshi T., Kobayashi Y., Horiuchi C., Suzuki R., Toyoda K., Iihara K., Minematsu K., Ikeda T., Yoshimatsu J.

**Language:** English

**Abstract:** OBJECTIVE: Cerebral stroke is a severe complication of pregnancy that may cause maternal death. The purpose of the present study was to investigate the maternal outcomes for stroke occurred during pregnancy and puerperium. STUDY DESIGN: A total of 33 patients with stroke were investigated retrospectively during pregnancy and postpartum 6 weeks at a single institution. Maternal and fetal information were collected from medical charts between 1983 and 2011. RESULTS: Of 33 patients, 8 had cerebral infarction (CI), 20 had intracerebral hemorrhage (ICH), and 5 had subarachnoid hemorrhage (SAH). Of these vascular events 3 occurred at 1st trimester, 13 at 2nd, 13 at 3rd, and 4 at postpartum period. All the CI patients had the vertebrobasilar arterial territory stroke and complained severe headache. Two of them were diagnosed as having posterior cerebral artery dissection. In all of 5 SAH patients ruptured aneurysm was identified and they were surgically clipped except one who was out of the indication and finally died. As a cause of ICH, 10 patients had arteriovenous malformations, 3 had moyamoya disease, 6 had gestational hypertension, and 1 had none cause. Three patients (two ICH and one SAH) died. All of these patients had massive intraparenchymal hematoma. Six patients were dependent in the chronic stage corresponding to the modified Rankin Scale of 3 to 5. Four fetuses died during the acute stage of stroke. CONCLUSION: Stroke during and after pregnancy showed high mortality rate of 9%, and 20% of sequela in the chronic stage in this present study. 80% of stroke had occurred in the 2nd and 3rd trimester of pregnancy. Gestational hypertension was the highest causes of nonorganic cerebral vascular injuries.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

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**Title:** Subarachnoid hemorrhage from intracranial aneurysms during pregnancy and the puerperium.

**Citation:** Neurologia medico-chirurgica, Jan 2013, vol. 53, no. 8, p. 549-554, 1349-8029 (2013)

**Author(s):** Kataoka, Hiroharu, Miyoshi, Takekazu, Neki, Reiko, Yoshimatsu, Jun, Ishibashi-Ueda, Hatsue, Iihara, Koji

**Abstract:** Subarachnoid hemorrhage (SAH) due to the rupture of an intracranial aneurysm (IA) is a rare but serious complication of pregnancy and is responsible for important morbidity and mortality during pregnancy. This study reviewed reports of ruptured IA during pregnancy and the puerperium, and our own cases of ruptured IA in pregnant women. Hemorrhage occurred predominantly during the third trimester of pregnancy, when maternal cardiac output and blood volume increase and reach maximum. Physiological and hormonal changes in pregnancy are likely to affect the risk of IA rupture. Ruptured IAs during pregnancy should be managed based on neurosurgical considerations, and the obstetrical management of women with ruptured IAs should be decided according to the severity of SAH and the gestational age. Emergent cesarean section followed by clipping or coiling of aneurysms is indicated if the maternal condition and the gestational age allow such interventions. Although SAH during pregnancy can result in disastrous outcomes, the necessity of intracranial screening for high-risk pregnant women is still controversial.

**Source:** Medline

**Full Text:**

Available from *National Library of Medicine* in [Neurologia medico-chirurgica](#)

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**Title:** A case series of maternal mortality due to subarachnoid haemorrhage (SAH)

**Citation:** International Journal of Gynecology and Obstetrics, October 2012, vol./is. 119/(S829), 0020-7292 (October 2012)

**Author(s):** McMorran L.E., McMillen R.M.

**Language:** English

**Abstract:** Objectives: To review a case series of four instances of maternal mortality due to SAH in patients booked for confinement in the Northern Health and Social Care Trust (NHSCT), Northern Ireland. Materials: Case notes and radiological image review. Methods: The case notes and radiological images in relation to four maternal deaths due to SAH in patients booked for confinement in the Northern Trust between 2008-2010 were reviewed, and a literature search performed. Results: 13,500 patients were delivered in the Northern HSC Trust between 2008 and 2010. Four patients were identified in which SAH was the cause of death either antenatally or in the intrapartum period. Two patients were brought to A & E collapsed and in cardiac arrest. A third had a tonic-clonic seizure following a normal vaginal delivery and subsequently went into cardiac arrest. The final patient lost cardiac

output following delivery of the anterior fetal shoulder. Both of the patients who arrested in the Labour Ward were effectively resuscitated, underwent prompt computerized tomography (CT) scans (the images are presented) to confirm the diagnosis, and were transferred to the Intensive Care unit. Conclusions: In the most recent UK Maternal Mortality Report there were 6 deaths in three years due to SAH. The incidence in the general population is 8/100,000 per year and the condition poses a significant diagnostic and management challenge. The prognosis remains poor: 15% die before admission to hospital and 50% within 30 days. One third of survivors are dependent. The series identified the contribution of PRactical Obstetric Multi- Professional Training ('PROMPT') resulting in timely and effective resuscitation measures being employed by the first responders in the delivery suite. We highlight the beneficial adjunct of immediate CT scanning to confirm the diagnosis, assess the prognosis, give time to counsel relatives and lastly, but importantly, avoid the angst of a Coroner's Inquest in two cases. Subarachnoid haemorrhage remains a leading indirect cause of maternal death with sadly few or no prodromal features in our series of pregnant women. (Figure presente).

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

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**Title:** Female risk factors for subarachnoid hemorrhage: a systematic review.

**Citation:** Neurology, Sep 2012, vol. 79, no. 12, p. 1230-1236, 1526-632X (September 18, 2012)

**Author(s):** Algra, Annemijn M, Klijn, Catharina J M, Helmerhorst, Frans M, Algra, Ale, Rinkel, Gabriël J E

**Abstract:** To systematically review the literature on female risk factors and risk of SAH. We searched Medline and EMBASE for articles published between January 1985 and July 2011. For all studies fulfilling the predefined criteria, we obtained risk ratios (RRs) or odds ratios (ORs) with 95% confidence intervals (CIs) for female risk factors. We pooled crude and adjusted ORs (aORs) with a general variance-based random-effects method. We evaluated methodologic quality with the Newcastle-Ottawa Scale. We included 16 studies; 8 had good quality. Twelve studies had a case-control design, 3 studies had a longitudinal design, and 1 study had a case-crossover design. Overall aORs were 1.31 (95% CI 1.05-1.64; 5 studies, 2 with good quality [GQ]) for current use of combined oral contraceptives (COC), 0.90 (95% CI 0.74-1.09; 7 studies, 4 GQ) for ever COC use, 0.86 (95% CI 0.69-1.08; 6 studies, 3 GQ) for current use of hormone replacement therapy (HRT), 0.74 (95% CI 0.54-1.00; 3 studies, 1 GQ) for ever use of HRT, and 1.29 (95% CI 1.03-1.61; 5 studies, 2 GQ) for postmenopausal women. Data on parity and age at menarche were heterogeneous. Risk of subarachnoid hemorrhage (SAH) was not increased during pregnancy, labor, or puerperium (RR 0.40, 95% CI 0.20-0.90; 1 GQ study). Female hormone levels might influence risk of SAH, but the pathophysiology of this effect and its influence on the difference in incidence of SAH between the sexes remains unclear. Further studies are needed to identify modifiable risk factors of SAH in women older than age 50.

**Source:** Medline

**Full Text:**

Available from *Ovid* in [Neurology](#)

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**Title:** Endovascular treatment of ruptured intracranial aneurysms during pregnancy: is this the best way forward? Case report and review of the literature.

**Citation:** Clinical neurology and neurosurgery, Jul 2012, vol. 114, no. 6, p. 703-706, 1872-6968 (July 2012)

**Author(s):** Tarnaris, Andrew, Haliasos, Nikolaos, Watkins, Laurence D

**Abstract:** Subarachnoid haemorrhage in pregnancy has traditionally been treated by surgical clipping however lately cases of successful coiling have been reported. Nevertheless, the long-term outcome of coiling is not well known in pregnant women. Mortality due to rebleeding of an incompletely treated aneurysm remains high. Only 15 cases of successful endovascular coiling during pregnancy have been reported so far. We report the case of a pregnant woman who presented with aneurysmal subarachnoid hemorrhage (WFNS Grade III) due to rupture of a right posterior communicating artery aneurysm. The patient underwent endovascular coiling successfully followed by an elective caesarian section and delivery of a healthy baby. However, during the course of a 2-year follow up the patient had suffered two relapses of the coiled aneurysm which required additional treatment. These events have affected her choice of extending her family. The small risk of recurrence and the potential impact on future pregnancies should be explicitly communicated to patients in cases of endovascular coiling. Copyright © 2011 Elsevier B.V. All rights reserved.

**Source:** Medline

**Full Text:**

Available from *ProQuest* in [Clinical Neurology and Neurosurgery](#)

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**Title:** Intraspinal and intracranial subarachnoid haemorrhage with severe cerebral vasospasm after spinal anaesthesia for assisted delivery.

**Citation:** British journal of anaesthesia, May 2012, vol. 108, no. 5, p. 885-886, 1471-6771 (May 2012)

**Author(s):** Espinosa-Aguilar, M, Hernández-Palazón, J, Fuentes-García, D

**Source:** Medline

**Full Text:**

Available from *Highwire Press* in [British Journal of Anaesthesia](#)

Available from *Oxford University Press* in [BJA: British Journal of Anaesthesia](#); Note: ;  
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 from *British Journal of Anaesthesia (BJA)* in [Patricia Bowen Library and Knowledge  
Service West Middlesex university Hospital](#)

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**Title:** Carotid-cavernous fistula in term pregnancy due to spontaneous rupture of carotid-cavernous aneurysm.

**Citation:** The journal of obstetrics and gynaecology research, Feb 2012, vol. 38, no. 2, p. 427-430, 1447-0756 (February 2012)

**Author(s):** Doğan, Selen, Salman, Mehmet Coskun, Deren, Ozgur, Geyik, Serdar

**Abstract:** Carotid-cavernous aneurysm accounts for 2-9% of all intracranial aneurysms. The rupture of carotid-cavernous aneurysm is usually caused by a trauma. Nevertheless, spontaneous rupture may rarely be encountered. Here, we report a term pregnant woman who was diagnosed to have a spontaneous carotid-cavernous fistula due to carotid-cavernous aneurysm rupture and was managed with detachable balloon and coils immediately after cesarean section. © 2011 The Authors. Journal of Obstetrics and Gynaecology Research © 2011 Japan Society of Obstetrics and Gynecology.

**Source:** Medline

**Full Text:**

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)  
Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

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**Title:** Sensitivity of computed tomography angiography vs catheter angiography in the detection of a ruptured intracranial infectious aneurysm in a pregnant woman.

**Citation:** Archives of neurology, Feb 2012, vol. 69, no. 2, p. 270-271, 1538-3687 (February 2012)

**Author(s):** Sun, Lin-Quan, Slivka, Andrew P

**Source:** Medline

**Full Text:**

Available from *Free Access Content* in [Archives of Neurology](#)

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**Title:** Peripartum subarachnoid hemorrhage: nationwide data and institutional experience.

**Citation:** Anesthesiology, Feb 2012, vol. 116, no. 2, p. 324-333, 1528-1175 (February 2012)

**Author(s):** Bateman, Brian T, Olbrecht, Vanessa A, Berman, Mitchell F, Minehart, Rebecca D, Schwamm, Lee H, Leffert, Lisa R

**Abstract:** Subarachnoid hemorrhage (SAH) in pregnancy occurs because of a variety of etiologies, which range from ruptured aneurysms to benign venous bleeding. The more malignant etiologies represent an important cause of maternal morbidity and mortality. We sought to investigate the epidemiology and mechanisms of pregnancy-related SAH. Using the Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project, Agency for Healthcare Research and Quality, we extracted pregnancy-related admissions for women ages 15-44 from 1995-2008 and identified admissions complicated by SAH. Logistic regression identified independent predictors of SAH. Outcomes and risk factors were then compared with age-matched, nonpregnant women with SAH. We also analyzed our institution's experience with pregnancy-related SAH. There were 639 cases (5.8 per 100,000 deliveries) of pregnancy-related SAH in the cohort during the study period; SAH was associated with 4.1% of all pregnancy-related in-hospital deaths. More than half of the SAH cases occurred postpartum. Advancing age, African-American race, Hispanic ethnicity, hypertensive disorders, coagulopathy, tobacco, drug or alcohol abuse, intracranial venous thrombosis, sickle cell disease, and hypercoagulability were independent risk factors for pregnancy-related SAH. Compared with SAH in nonpregnant controls, pregnancy-related SAH had lower clipping/coiling rates (12.7% vs. 44.5%,  $P < 0.001$ ). We identified 12 cases of pregnancy-related SAH in our hospital, the majority of which presented postpartum and with severe headache. SAH during pregnancy results from a range of etiologies, and is less likely to be because of a cerebral aneurysm than SAH occurring in the nonpregnant patient. Peripartum SAH frequently occurs in the setting of hypertensive disorders.

**Source:** Medline

**Full Text:**

Available from *Free Access Content* in [Anesthesiology](#)

Available from *Ovid* in [Anesthesiology](#).

Available from *Ovid* in [Anesthesiology](#)

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**Title:** Aneurysmal subarachnoid haemorrhage in pregnancy: a case series.

**Citation:** Translational medicine @ UniSa, Jan 2012, vol. 2, p. 59-63, 2239-9747 (January 2012)

**Author(s):** Guida, Maurizio, Maurizio, Guida, Altieri, Roberto, Roberto, Altieri, Palatucci, Valeria, Valeria, Palatucci, Visconti, Federica, Federica, Visconti, Pascale, Renato, Renato, Pascale, Marra, Marialuisa, Marialuisa, Marra, Locatelli, Giampiero, Giampiero, Locatelli, Saponiero, Renato, Renato, Saponiero, Tufano, Rosalba, Rosalba, Tufano, Bifulco, Francesca, Francesca, Bifulco, Piazza, Ornella

**Abstract:** Pregnancy is a recognized risk factor for aneurysmal subarachnoid hemorrhage (SAH). Headache is very frequent in normal pregnancy and it is a common sign shared between several intracranial diseases. We present a case series of 10 women in the third trimester of pregnancy admitted to our intensive care unit (ICU) with neurological signs and symptoms. 4 of these patients were diagnosed with SAH. Data in this study suggest that a timely diagnosis and an appropriate treatment is crucial for mother and baby.



**Source:** Medline

**Full Text:**

Available from *National Library of Medicine* in [Translational Medicine @ UniSa](#)

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**Title:** Uneventful delivery with caesarean section in a woman with a history of endovascular management of an intracranial aneurysm.

**Citation:** Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology, Oct 2011, vol. 31, no. 7, p. 664., 1364-6893 (October 2011)

**Author(s):** Mavromatidis, G, Dinas, K, Mamopoulos, A, Delkos, D, Vosnakis, C, Michailidis, K, Rouso, D

**Source:** Medline

**Full Text:**

Available from *Taylor & Francis* in [Journal of Obstetrics and Gynaecology](#)

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**Title:** Postpartum cerebral angiopathy presenting with non-aneurysmal subarachnoid hemorrhage

**Citation:** Journal of Clinical Neuroscience, September 2011, vol./is. 18/9(1269-1271), 0967-5868;1532-2653 (September 2011)

**Author(s):** Lee S.-Y., Sheen S.H., Lee S.H., Kim S.S., Kim C.H., Yie K.S., Kim S.H.

**Language:** English

**Abstract:** Parturition increases the risk of strokes of various types, including postpartum cerebral angiopathy (PCA), which is characterized by reversible multifocal vasoconstriction of the cerebral arteries. We describe an unusual presentation of PCA associated with postpartum non-aneurysmal subarachnoid hemorrhage (SAH). A 31-year-old multiparous woman complained of sudden headache 3 hours after an uncomplicated vaginal delivery. She had no history of pregnancy-induced hypertension. SAH was found over the bilateral frontoparietal convexities with multifocal vasculopathy. Her symptoms resolved completely within 1 week. The findings of a follow-up neurological examination, cerebral angiography, and brain MRI were normal after 2 months. PCA syndrome may be associated with postpartum non-aneurysmal SAH. © 2011 Elsevier Ltd. All rights reserved.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Cortical subarachnoid hemorrhage associated with reversible cerebral vasoconstriction syndrome after elective triplet cesarean delivery.

**Citation:** Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology, Jun 2011, vol. 32, no. 3, p. 497-501, 1590-3478 (June 2011)

**Author(s):** Albano, Beatrice, Del Sette, Massimo, Roccatagliata, Luca, Gandolfo, Carlo, Primavera, Alberto

**Abstract:** Reversible cerebral vasoconstriction syndromes (RCVS) comprise a group of disorders characterized by prolonged, but reversible vasoconstriction of the cerebral arteries, usually associated with acute-onset, severe, recurrent headaches, with or without additional neurological signs and symptoms. Various complications of this condition have been observed, such as cortical subarachnoid hemorrhages (cSAH), intracerebral hemorrhages, reversible posterior leukoencephalopathy, ischaemic strokes and transient ischaemic attacks. It is important to include RCVS in thunderclap headache differential diagnosis and among non-aneurismatic subarachnoid hemorrhage causes. In the past years, thanks to the major diffusion of new diagnostic tools such as magnetic resonance, computed tomography and digital subtraction angiography, RCVS have been demonstrated to be more frequent than previously thought. We report an illustrative case of a woman affected by a small cSAH, associated to RCVS, after elective triplet cesarean delivery. To our knowledge, this is the first case of cSAH associated to RCVS after a triplet pregnancy.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Neurological Sciences](#)

Available from *ProQuest* in [Neurological Sciences](#)

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**Title:** Female risk of subarachnoid heamorrhage: A systematic review with emphasis on hormonal, menstrual and reproductive factors

**Citation:** Cerebrovascular Diseases, May 2011, vol./is. 31/(2), 1015-9770 (May 2011)

**Author(s):** Algra A.M., Klijn C.J.M., Helmerhorst F.M., Algra A., Rinkel G.J.E.

**Language:** English

**Abstract:** Background: Incidence of subarachnoid haemorrhage (SAH) is higher in women than in men, in particular after age 50. We performed a systematic review and 322meta?analysis of the literature on female risk factors for SAH with emphasis on hormonal and reproductive factors. Methods: We searched Medline and EMBASE for articles published between January 1985 and June 2010. For each of the studies fulfilling predefined inclusion criteria, we obtained risk ratios (RRs) or odds ratios (ORs) with corresponding 95% confidence intervals (CIs) for the different risk factors studied. We pooled crude and adjusted ORs (aORs) with a general variance based random effects

method. Results: We included 12 case-control, one longitudinal, and one case-crossover study. The overall aORs were 1.31 (95% CI: 1.05-1.64) for current use of oral contraceptives (OCP) and 0.90 (95% CI: 0.74-1.09) for ever use of OCP, 0.75 (95% CI: 0.56-0.99) for current use of hormone replacement therapy (HRT) and 0.74 (95% CI: 0.54-1.00) for ever use of HRT. Women who had their menarche at a young age (<13y) were at higher risk of SAH (aOR 2.81; 95%CI: 1.61-4.68). No statistically significant effects were found for premenopausal status (aOR 0.74; 95% CI: 0.51-1.07), older age (>50y) at menopause (OR 1.04; 95% CI: 0.72-1.49) and older age (>26y) at first childbirth (aOR 1.45; 95% CI: 0.91-2.33). Data on parity were heterogeneous. The risk of SAH was not increased during pregnancy, labour and the puerperium (RR 0.4; 95% CI: 0.2-0.9). Conclusion: Female hormone levels characteristic for reproductive age, i.e., the physiological premenopausal state or HRT during the postmenopausal state, are associated with a lower risk of SAH. These observations, however, do not provide a straightforward explanation for the difference in incidence of SAH between the sexes from age 50 onwards.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *ProQuest* in [Cerebrovascular Diseases](#)

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**Title:** Reversible cerebral vasoconstriction syndrome in a postpartum female complicated by subarachnoid haemorrhage

**Citation:** BMJ case reports, 2011, vol./is. 2011/(no pagination), 1757-790X (2011)

**Author(s):** Zakaria R., Coulter I., Enevoldson P., May P.

**Language:** English

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *HighWire Press* in [BMJ Case Reports](#)

Available from *National Library of Medicine* in [BMJ Case Reports](#)

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**Title:** Endovascular treatment of an acutely ruptured intracranial aneurysm in pregnancy: report of eight cases.

**Citation:** Emergency radiology, May 2010, vol. 17, no. 3, p. 205-207, 1438-1435 (May 2010)

**Author(s):** Pumar, José Manuel, Pardo, Maria I, Carreira, Jose M, Castillo, Jose, Blanco, Miguel, Garcia-Allut, Alfredo

**Abstract:** Treatment of acutely ruptured intracranial aneurysms in pregnancy represents a clinical challenge requiring a meticulously selected strategy. We report eight cases of ruptured cerebral aneurysms in eight pregnant patients treated safely and effectively via an endovascular approach.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Emergency Radiology](#)

Available from *ProQuest* in [Emergency Radiology](#)

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**Title:** Subarachnoid hemorrhage and pregnancy: On purpose of two cases

**Citation:** Journal of Maternal-Fetal and Neonatal Medicine, May 2010, vol./is. 23/(265), 1476-7058 (May 2010)

**Author(s):** Gonzalez Perez I., Aibar Villan L., Aguilar Romero M.T., Perez Herrezuelo I., Guerrero Saez T.B., Manrique Fuentes M.G.

**Language:** English

**Abstract:** Brief Introduction: The secondary cerebral hemorrhage to arteriovenous malformation or intracranial aneurysm is a serious complication of the pregnancy with an incidence of 1-5:10,000. Clinical Cases or Summary Results: CLINIC CASE 1: A 21 weeks pregnant woman was hospitalized with a hemicranial headache, tonic-clonic convulsive crisis, and loss of strength in left hemibody. The cranial Angio TAC shows right frontotemporal hematoma and aneurysm of the post-informant artery. Diagnostic-therapeutic arteriography is performed to embolize the aneurysm and the evacuation of the hematoma by means of parietal craniotomy. Ten days after it is presented postsurgical vasospasm treated with triple H therapy. In the week 38+2, an elective cesarean is performed. CLINIC CASE 2: A 13 weeks pregnant presents syncopal manifestations accompanied by headache and cervical pain. While she is hospitalized, she presents two episodes of epileptic crisis that course with rigidity, sphincter relaxation and ocular version. RNM informs about subarachnoid and secondary intraventricular hemorrhage to arteriovenous malformation of the post-cerebral artery. She is discharged with complete rest and antimicrobial treatment. In the week 37+4, an elective cesarean is performed. Conclusions: The subarachnoid hemorrhage is an infrequent but serious complication during the pregnancy, that requires an early diagnostic and treatment in order to avoid the mother's death and the fetus' damage. A vaginal labor is not a contraindication to finish the pregnancy provided that the aneurysm is clipped.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

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

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**Title:** Complete heart block complicating intracranial aneurysm surgery in a pregnant patient

**Citation:** Neurology India, January 2010, vol./is. 58/1(146), 0028-3886;1998-4022 (01 Jan 2010)

**Author(s):** Ganjoo P., Navkar D.V., Tandon M.S.

**Language:** English

**Publication Type:** Journal: Letter

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Neurology India](#)

Available from *ProQuest* in [Neurology India](#)

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**Title:** Anesthetic conduct in cesarean section in a parturient with unruptured intracranial aneurysm.

**Citation:** Revista brasileira de anesthesiologia, Nov 2009, vol. 59, no. 6, p. 746-750, 1806-907X (2009 Nov-Dec)

**Author(s):** Carvalho, Luciana de Souza Cota, Vilas Boas, Walkiria Wingester

**Abstract:** The anesthetic management of a parturient with unruptured intracranial aneurysm scheduled to undergo cesarean section is interesting, since it has several particularities associated with pregnancy-related physiologic changes that are associated with the risk of aneurysmal rupture during the anesthetic procedure. Studies on this subject are rare in the literature and, therefore, the dissemination of those cases is important. This is a 31-year old female at term with unruptured intracranial aneurysm scheduled for cesarean section under epidural block. The procedure evolved without maternal or fetal intercurrents. Evidence-based recommendations for obstetric anesthesia in patients with unruptured intracranial aneurysm are lacking. Experimental or clinical data confirming or refuting general anesthesia or regional blocks in this context do not exist. Thus, the decision of which technique should be used is individual, considering the risks and benefits of each procedure and the experience of the anesthesiologist.

**Source:** Medline

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**Title:** A case of postpartum cerebral angiopathy with subarachnoid hemorrhage.

**Citation:** Nature reviews. Neurology, Sep 2009, vol. 5, no. 9, p. 512-516, 1759-4766 (September 2009)

**Author(s):** Chik, Yolanda, Hoesch, Robert E, Lazaridis, Christos, Weisman, Carla J, Llinas, Rafael H

**Abstract:** A 33-year-old woman experienced a thunderclap headache immediately postpartum. The headache recurred over the next 10 days, and the patient also developed generalized tonic-clonic seizures. A subarachnoid hemorrhage was demonstrated on a head CT scan. Physical examination, laboratory tests, brain CT scan, brain MRI scan, brain magnetic resonance angiogram, brain magnetic resonance venogram, cerebral angiography, transcranial Doppler ultrasound, EEG. Postpartum cerebral angiopathy. NSAIDs and opioid analgesics administered on postpartum day 3 provided partial headache relief. The next day, a blood patch was performed and intravenous caffeine, fluid and opioid analgesia were given to treat a suspected dural puncture headache. Following diagnosis of postpartum cerebral angiopathy on postpartum day 10, nimodipine was initiated to treat the vasospasm, and the headache was treated with opioid analgesics and toradol, followed by naproxen. The patient also received a 3-day course of intravenous magnesium sulfate.

**Source:** Medline

**Full Text:**

Available from *ProQuest* in [Nature Reviews. Neurology](#)

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**Title:** Postpartum subarachnoid hemorrhage due to Moyamoya disease associated with renal artery stenosis.

**Citation:** The journal of obstetrics and gynaecology research, Aug 2009, vol. 35, no. 4, p. 787-789, 1341-8076 (August 2009)

**Author(s):** Matsumoto, Yasuyo, Asada, Masahiro, Mukubou, Masaaki

**Abstract:** Moyamoya disease is a cerebrovascular stenotic or occlusive disease predominantly seen in Asian countries. Sometimes there are coexisting renal artery lesions in Moyamoya disease patients. A 32-year-old multipara had a cesarean section at 33 gestational weeks due to preeclampsia. One month later, she developed subarachnoid hemorrhage and angiography demonstrated Moyamoya vessels with renal artery stenosis. After conservative therapy, the patient was discharged without any deficits. Our conclusion is that patients with Moyamoya disease carry a risk of cerebrovascular accident during pregnancy and postpartum. In this case, we did not diagnose Moyamoya disease with renal artery stenosis until the patient developed subarachnoid hemorrhage. It is very important to make a careful differential diagnosis of hypertension during pregnancy and the postpartum period.

**Source:** Medline

**Full Text:**

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

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**Title:** Occurrence of perimesencephalic subarachnoid hemorrhage during pregnancy

**Citation:** Neurocritical Care, June 2009, vol./is. 10/3(339-343), 1541-6933 (June 2009)

**Author(s):** Hirsch K.G., Froehler M.T., Huang J., Ziai W.C.

**Language:** English

**Abstract:** Background: Perimesencephalic subarachnoid hemorrhage (P-SAH) is a benign subset of subarachnoid hemorrhage with a favorable prognosis and low rate of re-bleeding. Risk factors may include hypertension and tobacco use, but it has not previously been reported during pregnancy. Methods: We report two cases of P-SAH in pregnant women, a 40-year-old female, 8-weeks pregnant and a 37-year-old female at 35 weeks gestational age. Results: CT scan confirmed P-SAH in both cases. CT angiography in one case and cerebral angiogram in the other did not reveal aneurysm or other potential bleeding source. The patients underwent transcranial Doppler ultrasound monitoring without evidence of vasospasm. Conclusion: P-SAH hemorrhage may occur during early or late pregnancy. We do not propose an increased risk of P-SAH during pregnancy. The clinical course appears favorable and CT angiography alone may be considered the preferred diagnostic test to assess for aneurysm in first trimester pregnancy. © 2009 Humana Press Inc.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Springer Link Journals* in [Neurocritical Care](#)

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**Title:** The risk of aneurysmal subarachnoid hemorrhage during pregnancy, delivery, and the puerperium in the utrecht population case-crossover study and standardized incidence ratio estimation

**Citation:** Stroke, April 2009, vol./is. 40/4(1148-1151), 0039-2499 (01 Apr 2009)

**Author(s):** Groenestege A.T.T., Rinkel G.J.E., Van Der Bom J.G., Algra A., Klijn C.J.M.

**Language:** English

**Abstract:** Background and Purpose-It is unclear whether the risk of aneurysmal subarachnoid hemorrhage (aSAH) is increased during pregnancy, labor, and the puerperium. We compared the risk of aSAH during this period with the risk outside this period. Methods-We included women with aSAH between 18 and 42 years of age (n=244) from our prospectively collected database of patients with subarachnoid hemorrhage treated in the University Medical Center Utrecht, the provincial referral center, between January 1987 and April 2006. We estimated the relative risk of aSAH during pregnancy, delivery, or the puerperium by a case-crossover design and calculated a standardized incidence ratio,

dividing the observed number of patients with aSAH during pregnancy, delivery, or puerperium by the expected number based on the incidence in the general population of women of the same age during the study period. Results-Of the 244 women, 4 were pregnant, 3 in the puerperium and none in labor. The relative risk of aSAH during pregnancy, delivery, or the puerperium was 0.4 (95% CI, 0.2 to 0.9). Based on the number of women aged 18 to 42 years within the catchment area of our hospital and the number of pregnancies within the study period, the expected number of patients with aSAH during pregnancy, delivery, or the puerperium was 12, resulting in a standardized incidence ratio of 0.6 (95% CI, 0.2 to 1.1). Conclusions-The risk of aSAH is not increased during pregnancy, labor, and the puerperium. There is no need to advise against pregnancy in women with an increased risk of subarachnoid hemorrhage and no evidence to advise against vaginal delivery in such women. &#xa9; 2009 American Heart Association, Inc.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Stroke](#)

Available from *Ovid* in [Stroke](#)

Available from *Highwire Press* in [Stroke](#)

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**Title:** A case of postpartum cerebral angiopathy with subarachnoid hemorrhage

**Citation:** Nature Reviews Neurology, 2009, vol./is. 5/9(512-516), 1759-4758;1759-4766 (2009)

**Author(s):** Chik Y., Hoesch R.E., Lazaridis C., Weisman C.J., Llinas R.H.

**Language:** English

**Abstract:** Background. A 33-year-old woman experienced a thunderclap headache immediately postpartum. The headache recurred over the next 10 days, and the patient also developed generalized tonic-clonic seizures. A subarachnoid hemorrhage was demonstrated on a head CT scan. Investigations. Physical examination, laboratory tests, brain CT scan, brain MRI scan, brain magnetic resonance angiogram, brain magnetic resonance venogram, cerebral angiography, transcranial Doppler ultrasound, EEG. Diagnosis. Postpartum cerebral angiopathy. Management. NSAIDs and opioid analgesics administered on postpartum day 3 provided partial headache relief. The next day, a blood patch was performed and intravenous caffeine, fluid and opioid analgesia were given to treat a suspected dural puncture headache. Following diagnosis of postpartum cerebral angiopathy on postpartum day 10, nimodipine was initiated to treat the vasospasm, and the headache was treated with opioid analgesics and toradol, followed by naproxen. The patient also received a 3-day course of intravenous magnesium sulfate.

**Publication Type:** Journal: Article



**Source:** EMBASE

**Full Text:**

Available from *ProQuest* in [Nature Reviews. Neurology](#)

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**Title:** Occurrence of perimesencephalic subarachnoid hemorrhage during pregnancy.

**Citation:** Neurocritical care, Jan 2009, vol. 10, no. 3, p. 339-343, 1541-6933 (2009)

**Author(s):** Hirsch, Karen G, Froehler, Michael T, Huang, Judy, Ziai, Wendy C

**Abstract:** Perimesencephalic subarachnoid hemorrhage (P-SAH) is a benign subset of subarachnoid hemorrhage with a favorable prognosis and low rate of re-bleeding. Risk factors may include hypertension and tobacco use, but it has not previously been reported during pregnancy. We report two cases of P-SAH in pregnant women, a 40-year-old female, 8-weeks pregnant and a 37-year-old female at 35 weeks gestational age. CT scan confirmed P-SAH in both cases. CT angiography in one case and cerebral angiogram in the other did not reveal aneurysm or other potential bleeding source. The patients underwent transcranial Doppler ultrasound monitoring without evidence of vasospasm. P-SAH hemorrhage may occur during early or late pregnancy. We do not propose an increased risk of P-SAH during pregnancy. The clinical course appears favorable and CT angiography alone may be considered the preferred diagnostic test to assess for aneurysm in first trimester pregnancy.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Neurocritical Care](#)

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**Title:** Unilateral carotid and vertebral artery dissections and contralateral subarachnoid hemorrhage in a postpartum patient.

**Citation:** Acta neurologica Taiwanica, Jun 2008, vol. 17, no. 2, p. 94-98, 1028-768X (June 2008)

**Author(s):** Hsieh, Peiyuan F, Lee, Yi-Chung, Chang, Ming-Hong

**Abstract:** Postpartum arterial dissection combined with subarachnoid hemorrhage (SAH) is rare and its mechanism is uncertain. A 32 year-old woman had a delivery by cesarean section 12 days prior to admission to our hospital. From the first day of delivery, she breast-fed her baby, sitting with her head always turned to the right. Each feeding lasted around 2 hours. A bilateral throbbing headache began two days after childbirth, and intermittent numbness of the right face, chest and hand as well as weakness of the right hand developed nine days after giving birth. A physical examination revealed transient mild hypertension and right hemiparesis. Her cholesterol ranged from 204 to 263 mg/dl. Computed tomography, magnetic resonance angiography and duplex ultrasound disclosed left fronto-parietal junction SAH and dissections of the right internal carotid (ICA) and vertebral arteries. Our patient demonstrated (1) that postpartum arterial dissection was not limited

to natural delivery, (2) postpartum SAH could occur with dissections of the contralateral extracranial carotid and vertebral arteries, and (3) that turning one's head always to the same side during breast-feeding might be a risk factor for this unusual stroke pattern.

**Source:** Medline

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**Title:** An unusual intracranial aneurysm presenting in pregnancy.

**Citation:** International journal of obstetric anesthesia, Apr 2008, vol. 17, no. 2, p. 194-195, 1532-3374 (April 2008)

**Author(s):** Duggan, T, Simpson, A

**Source:** Medline

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**Title:** Postcesarean subarachnoid hemorrhage as the initial presentation of cerebral venous thrombosis.

**Citation:** Taiwanese journal of obstetrics & gynecology, Sep 2007, vol. 46, no. 3, p. 317-319, 1875-6263 (September 2007)

**Author(s):** Ko, Yuan-Pi, Hsu, Chin-Yuan, Yang, Chih-Lin, Cheng, Sho-Jen, Tsai, Hsin-Jung, Chen, Chin-Ping, Hsu, Yung-Wei

**Source:** Medline

**Full Text:**

Available from *Free Access Content* in [Taiwanese Journal of Obstetrics and Gynecology](#)

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**Title:** Postpartum rupture of an intracranial aneurysm

**Citation:** Obstetrics and Gynecology, February 2007, vol./is. 109/2 PART 2 SUPPL.(572-574), 0029-7844 (February 2007)

**Author(s):** Kanani N., Goldszmidt E.

**Language:** English

**Abstract:** BACKGROUND: The relative risk of intracerebral hemorrhage during pregnancy and 6 weeks postpartum is higher than that of the nongravid population. CASE: A 37-year-old multiparous, previously healthy woman appeared to have had a seizure on emergence from general anesthesia for cesarean delivery. Subsequent neuro-imaging revealed a giant unruptured internal carotid artery aneurysm. The day after discharge from the hospital, with planned outpatient neurosurgery follow-up, she re-presented with a subarachnoid hemorrhage. This ultimately resulted in her death. CONCLUSION: Given the significant

morbidity and mortality associated with cerebral aneurysms in pregnancy, they should be considered in all cases of acute neurological deterioration. Also, given the increased risk of aneurysmal rupture in the gravid patient, expedited management of newly discovered cerebral aneurysms should be contemplated. &#xa9; 2007 The American College of Obstetricians and Gynecologists.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

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**Title:** Subarachnoid haemorrhage in pregnancy.

**Citation:** Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology, Jan 2007, vol. 27, no. 1, p. 80-81, 0144-3615 (January 2007)

**Author(s):** Darbhamulla, S V, Reddy, R

**Source:** Medline

**Full Text:**

Available from *Taylor & Francis* in [Journal of Obstetrics and Gynaecology](#)

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**Title:** Parity and risk of death from subarachnoid hemorrhage in women: Evidence from a cohort in Taiwan

**Citation:** Neurology, August 2006, vol./is. 67/3(514-515), 0028-3878 (August 2006)

**Author(s):** Yang C.-Y., Chang C.-C., Kuo H.-W., Chiu H.-F.

**Language:** English

**Abstract:** The authors examined the relationship in women between age at first birth, parity, and subarachnoid hemorrhage mortality. They followed each woman from the time of her first birth and linked vital status with a mortality database. The risk was increased by 8% for each additional year of mother's age at first birth. The relative risk was 0.63 for women who had borne two children and 0.62 for women with three or more births. Copyright &#xa9; 2006 by AAN Enterprises, Inc.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Neurology](#)

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**Title:** Eclamptic subarachnoid haemorrhage without hypertension.

**Citation:** Journal of clinical neuroscience : official journal of the Neurosurgical Society of Australasia, May 2006, vol. 13, no. 4, p. 474-476, 0967-5868 (May 2006)

**Author(s):** Moussouttas, Michael, Abubakr, Abuhuzief, Grewal, Raji Pail, Papamitsakis, Nikolaos

**Abstract:** Subarachnoid haemorrhage in pregnancy is often the result of aneurysmal rupture or severe hypertension. A young woman with postpartum eclampsia and 'normal' blood pressure developed sudden-onset head pain, and was found to have minor biconvexity subarachnoid hemorrhages. Serial angiograms of the cervicocranial vessels revealed no evidence of aneurysm or arteriovenous malformation. A follow-up angiogram revealed diffuse vessel narrowing, consistent with postpartum angiopathy. Treatment consisted only of nimodipine for the prevention of vasospasm. The patient made an excellent recovery, without residual neurological deficits.

**Source:** Medline

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**Title:** Lethal vertebral artery dissection in pregnancy: A case report and review of the literature

**Citation:** Archives of Pathology and Laboratory Medicine, April 2006, vol./is. 130/4(533-535), 0003-9985 (April 2006)

**Author(s):** Tuluc M., Brown D., Goldman B.

**Language:** English

**Abstract:** Subarachnoid hemorrhage represents a rare event in pregnancy with a high mortality rate. We present the case of a 39-year-old pregnant woman who developed right vertebral artery dissection with subsequent massive subarachnoid hemorrhage with fatal outcome. The macroscopic and microscopic autopsy findings are described. A review of the literature with a discussion of the varied predisposing factors for vertebral artery dissection and subarachnoid hemorrhage and the rarity of these events in pregnancy is provided.

**Publication Type:** Journal: Review

**Source:** EMBASE

**Full Text:**

Available from *EBSCOhost* in [Archives of Pathology & Laboratory Medicine](#)

Available from *ProQuest* in [Archives of Pathology and Laboratory Medicine](#)

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**Title:** Anesthetic management of the pregnant patient for endovascular coiling of an unruptured intracranial aneurysm.

**Citation:** Neurocritical care, Jan 2006, vol. 4, no. 1, p. 18-20, 1541-6933 (2006)

**Author(s):** Allen, G, Farling, P, McAtamney, D

**Abstract:** Diagnosis of an intracranial aneurysm during pregnancy is a rare event requiring multidisciplinary care for successful management. The knowledge base for the anesthesiologist involves principles of both obstetric and neuroanesthesia, as well as critical care. This article reports such a case and discusses the relevant pathophysiology, along with details of the perioperative management by the anesthesiology team.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Neurocritical Care](#)

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**Title:** Pregnant woman with subarachnoid hemorrhage and multiple intracranial aneurysms: A case report

**Citation:** Turkish Neurosurgery, 2006, vol./is. 16/2(100-104), 1019-5149 (2006)

**Author(s):** Kocak A., Ates O., Cayli S.R., Sarac K.

**Language:** English

**Abstract:** Aneurysmal subarachnoid haemorrhage (SAH) during pregnancy is rare but serious obstetric complication and may be confused with eclampsia. SAH occurs more often in primiparae and in the third trimester of pregnancy. The hemodynamic and endocrine changes play an important role in the growth and rupture of aneurysms. There are no differences in the clinical course of SAH among pregnant and non-pregnant patients. A 19-yr-old woman who was 34-weeks pregnant presented with an SAH, secondary to a ruptured left posterior communicating artery (L-PCoM) aneurysm. The angiogram revealed multiple cerebral aneurysms. Following initial recovery, she subsequently underwent simultaneous elective caesarean section and clipping of the aneurysms. The management and pathogenesis of a ruptured aneurysm during pregnancy is discussed.

**Publication Type:** Journal: Article

**Source:** EMBASE

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