

Endovascular Coiling of Ruptured Subarachnoid Haemorrhage in Pregnancy: A Case Report

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Abstract

Subarachnoid haemorrhage (SAH) is a life-threatening type of stroke caused by bleeding into the space surrounding the brain. Here this case report explains SAH condition in pregnancy. Where this Pregnancy is a recognized risk factor for aneurysmal subarachnoid haemorrhage (SAH). However, if immediate surgical treatment is given, the prognosis is good.

Keywords: Endovascular coiling; Subarachnoid; Haemorrhage; Pregnancy

Introduction

Haemorrhagic cerebral accidents are the third leading non-obstetric cause of mortality in pregnancy, with a rate of occurrence of about 1-5 per 10000 pregnancy [1]. Subarachnoid haemorrhage specifically, during pregnancy is rare, only several cases have been reported in the past few decades. The incidence ranges from 0.01% to 0.05% [2,3]. However, it must be attended and treated immediately once suspected due to its high maternal mortality rate of 40% to 83% [3-5]. The occurrence of subarachnoid haemorrhage in pregnancy is commonly due to a ruptured aneurysm or an arteriovenous malformation (AVM). The common signs and symptoms of subarachnoid haemorrhage are headache, nausea, vomiting, blurring of vision and neck stiffness. Focal neurological deficit or general loss in consciousness may be present. The management of such case should involve a multidisciplinary team, including the obstetrician, neurosurgeons, radiologists and intensivists. Treatment modalities including surgical clipping, coiling or even the choice of conservative treatment have been reported. It should not differ from that of non-pregnant patients. The decision of whether to deliver depends on individual cases and discussion between the obstetricians. Generally, the recommended route of delivery for patient in this case will be vaginal delivery. Caesarian section is only indicated if the patient is in coma or with brain stem damage. It is also indicated if there is a symptomatic vascular malformation diagnosed at term of pregnancy or if the interval between surgical and labour is less than 8 days [6]. Close neurological and obstetrical monitoring should follow any intervention done on the patients.

Case Report

Mdm G.C.L, a healthy 44-year-old primigravida at 21 weeks period of amenorrhoea presented to PPUM with sudden onset of headache and vomiting. She described the headache as throbbing in nature at the occipital region and radiated to the whole head. It was associated with blurred vision. This was a planned pregnancy and confirmed with monochorionic diamniotic twinning (MCDA) at 6 weeks period of amenorrhoea. On examination, she was alert and conscious with full Glasgow Coma scale (GCS) and her vitals were stable. Both pupils were equal and reactive to light. There was no neck stiffness and neurological examinations were normal. Other systemic examinations were also unremarkable. The abdomen was soft and non-tender. The uterus was enlarged corresponding to a 24 weeks gravid uterus size.

All investigations including a full blood count, renal function tests, liver function tests and uric acid were within the normal range. An urgent CT Angiogram Brain was arranged, and it was reported as presence of ruptured basilar tip aneurysm causing diffuse subarachnoid

haemorrhage in both cerebral hemispheres causing effacement of both Sylvian fissures and basal cisterns. There was an extension of bleed into tentorium cerebelli and inter-hemispheric fissure with associated sulci effacement. However, there was no midline shift. There was also intraventricular extension into the 4th ventricle causing mild dilatation of all the ventricles.

Minimal periventricular hypodensities in keeping with acute seepage. The findings were informed, explained and treatment were discussed. Coiling of the aneurysm was done on the same day. Mdm G.C.L was observed and monitored closely in the intensive care unit (ICU) after the procedure. She was prescribed with Oral Pravastatin 40 mg ON, oral Kepra 500 mg BD, oral Aspirin 100 mg OD and oral Ranitidine 150 mg BD. Subsequently, her symptoms improved, and her vitals remained stable. She was then discharged and was given a follow up visit with combined care of obstetricians and neurological team. A repeat MRI Brain which was done for 3 months after the coiling showed no residual basilar artery aneurysm. However, there was unchanged mild ventricular dilatation from previous CT scan with periventricular hyperintensity. An elective caesarean section was performed at 36 weeks period of amenorrhoea and both her twins were healthy.

Discussion

Several attempts have been done to relate the incidence of subarachnoid haemorrhage and pregnancy: A study done by Barrett et al. showed that over 50% of all ruptured arterial aneurysms in women under the age of 40 were pregnancy-related [2]. It was postulated that haemodynamic and endocrine changes play an important role in the growth and rupture of aneurysms during pregnancy [7]. Such changes include: Arterial intima and media changes, cardiac output increase to as much as 60% by the end of the second trimester, progressive increase in blood volume and pressure reaching maximum at term, and significant compression of the aorta and inferior vena cava by the gravid uterus which may cause redistribution of blood flow. With hypertension being known as one of the common pregnancy complications, it is also recognized as one of the risk factors in acute subarachnoid haemorrhage (present in 2/3 of all subarachnoid haemorrhage patients) [8]. Therefore,

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there certainly was a correlation between pregnancy and subarachnoid haemorrhage. However, in a retrospective case analysis done by Chiara et al., though hypertension was the most common risk factor in the studied population (acute subarachnoid haemorrhage in pregnancy), it only features 10-20% in statistics, as compared to the 2/3 of the general (non-pregnant) population that presented with hypertension in acute subarachnoid haemorrhage [9].

Another risk factor of subarachnoid haemorrhage in pregnancy was an existing intracranial aneurysms or arteriovenous malformation (AVM). Ortiz et al. and Weir et al. had reported cases demonstrating significant stimulatory effects of pregnancy on aneurysm growth, abrupt change in size occurred during pregnancy in a short period of time [10,11]. However, in a retrospective analysis done by Horton et al. in 1990, in patients with existing AVM of the brain, haemorrhage rate is the same between pregnant and non-pregnant women [12]. There actually exists bias in this area because patients who were known to have AVM or aneurysm were generally advised not to get pregnant. Therefore, a conclusion was yet to be drawn on the relationship between pregnancy and subarachnoid haemorrhage.

For demographic characteristic, studies had shown that patients who were primiparae and at their third trimester of gestation, had a higher risk of developing subarachnoid haemorrhage [13-15], which was partially relevant to the patient in this case report: she was a primiparae, but was only at 21 weeks of gestation, which was second trimester. 2 studies had indeed shown that, the incidence of subarachnoid haemorrhage peak at the third trimester: Hunt et al. described the incidence of subarachnoid haemorrhage in each trimester as: 6%, 31% and 55% in first, second and third trimester respectively [16], while Chiara et al. described the incidence as 7.7%, 19.2%, 73.1% in first, second and third trimester respectively [9]. The patient in this case report was at the age of 44. In the retrospective analysis done by Chiara et al. old age (defined as >40 in the study) was also the second most common risk factor of subarachnoid haemorrhage in pregnancy [9].

Recognition of the signs and symptoms of acute subarachnoid haemorrhage was particularly important especially in pregnancy due to the high maternal and foetal mortality rate. The most common presentations were headache, nausea and vomiting [9], which were also the presentations of the patient in this case. Focal neurological deficit was not noted upon presentation of the patient, which was consistent with the study: focal neurological deficit being less common.

Management of acute subarachnoid haemorrhage due to aneurysm in pregnancy varied from conservative treatment (spontaneous thrombosis) to surgical clipping or coiling. However, throughout the literature search done, a trend and shift towards coiling can be observed. There were only two cases of spontaneous thrombosis of ruptured aneurysm in pregnancy reported [17,18]. Some authors believe in spontaneous thrombosis of ruptured aneurysm in pregnancy due to the known physiological changes that happens in pregnancy, which is hypercoagulability. 1-2% of ruptured aneurysm in general show spontaneous and complete thrombosis on subsequent angiography [19]. However, most cases reported were of immediate surgical management of the aneurysms, including surgical clipping and coiling. There actually was not much controversy between conservative treatment and surgical intervention anymore attributing to the study published by Dias et al. demonstrating that in pregnant patients who were treated conservatively, the maternal mortality rate is 35%, foetal mortality rate is 17% [20]. The overall mortality rate of patients who were treated surgically and conservatively were 11% and 63% respectively [20]. Back in 2001, Meyers et al. had reported 2 cases

of acutely ruptured intracranial aneurysms in pregnancy successfully treated by endovascular coiling, that is using Guglielmi Detachable Platinum Coils (GDC). Other than that, there were also two more cases reporting the success of endovascular coiling using GDC in ruptured intracranial aneurysm in pregnancy [13]. In 2012, Tarnaris et al. also reported a case of coiling in subarachnoid haemorrhage due to the rupture of right posterior communicating artery aneurysm. The attempt was successful and followed by elective caesarean section and delivery of a healthy baby. However, after two years of following up with the patient, two relapses of the aneurysm have been reported.

Conclusion

Subarachnoid haemorrhage in pregnancy is rare but of great maternal and foetal mortality rate. However, if immediate surgical treatment is given, the prognosis is good. Therefore, it is vital for the obstetricians to recognize an acute subarachnoid haemorrhage as soon as possible to avoid complications. Further studies are warranted to evaluate the relevant risk factors of subarachnoid haemorrhage in pregnancy.

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