High risk pregnancy in a patient with angioma of the corpus callosum

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Summary: Literature data indicate that rupture of arterovenous malformations is 4 times more frequent in pregnant women.

The Authors present a case of cerebral hemangioma of the third medium anterior of the corpus callosum diagnosed in a patient at the 28th gestational week by Magnetic Resonance scan. The patient underwent elective caesarean section under peripheral anesthesia (peridural and spinal block by Bupivacaine) and delivered a male infant 4560 gr, 52 cm.

The postoperative course was uneventful. The arterovenous malformation constituted an important anesthesiologic risk factor but the Authors conclude that caesarean section can be safely performed with a very careful anesthesiological time schedule and a reliable haemodynamic monitoring.

INTRODUCTION

The frequency of cerebral tumours in pregnancy is very low (1/50.000) [1]. Very likely most of them are not diagnosed because symptoms are quite aspecific and can be ascribed to other pathologies. Pregnancy does not seem to influence the evolution of malignant tumours whereas it can induce an aggravation of symptoms leading to early diagnosis of highly vascularized benign tumours such as arterovenous malformations [1, 2].

Due to gestational hemodynamic and hormonal modifications, the lesion may dangerously grow and rupture [3]. On the other hand cerebral neoplasias do not seem to be able to influence pregnancy even though some Authors have reported a higher incidence of abortion and perinatal mortality [1].

Cavernous hemangioma of the Central Nervous System is a malformation characterized by abnormally dilated and intertwining blood vessels which prevent the growth of normal neural tissue. Subcortical areas, the bridge and nuclei of the base are the most frequent sites of cavernous angioma occurrence in the cerebral hemispheres [4, 5]. Localization in the fissure of Rolando can be held responsible

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for epileptic-like seizures whereas actual epileptic symptomatology is due to subcortical temporal localization ([6]).

Cavernous hemangioma localized at the IInd and IVth cerebral ventricle can cause hydroacephaly; when the site of hemangioma is the bridge fatal hemorrhages and palsies can occur ([7]). The localization in the corpus callosum is quite rare and determines alterations of memory, coordination and perceptual formation ([6]).

The relative risk of cavernous angioma increases in people in their thirties, forties and fifties and incidence is three times higher in men than in women ([5, 8]). One case out of three can have multiple localizations within the central nervous system ([8]).

At macroscopic observation cavernous angioma size varies from a few millimeters to several centimeters. It is usually dark-coloured with well defined, often lobulated profiles providing the lesion a mulberry-like appearance. Less frequently it is constituted of a pink coloured, non-clearly walled area in which small vascular spaces and brown zones caused by past hemorrhages and granular calcification zones can be observed ([8]).

Histology reveals different sized vascular spaces dilatated and tightly anastomosed with thickened vessel walls. The oldest lesions show diffused scleroialinosis associated with the presence of masses of cholesterol crystals. Vascular lumina are partially or completely packed with thrombotic material, more or less organized ([5, 8, 9]). Calcium frequently accumulates in the vessel interstices while the surrounding neural tissue is imbued with hemosiderinic pigment.

The Authors present a case of cerebral hemangioma of the third medium anterior of the corpus callosum diagnosed in a patient at the 28th gestational week. The obstetric, anesthesiologic, neurologic and histopathologic aspects of clinical management are reported.

CLINICAL CASE

C. L., 29 years old. *Family history*: father suffered from hypertension, deceased after myocardial infarction. *Personal medical history*: uneventful;Para 1001 eutocic delivery (male 4130 gr - 52 cm) in 1980; maternal breastfeeding.

Present pregnancy: L.M. 4.4.1991; 8th GW threatened abortion treated by tocolitic ritodrine infusion and 15 days rest in bed. The patient also referred some episodes of lipothymia lasting 15 minutes max. At the 24th week the patient was admitted to our Institute because of a fall. Objective examination showed multiple bruises on upper and lower limbs, no cranial trauma.

Hematochemical biohumoral and biophysical findings confirmed the good gestational evolution and the patient was sent home. At the 28th week of gestation the patient was admitted again to our Institute with mild paresthesia, pulsating cephalea, and had had two episodes of dyslalia and aphasia. Neurologic examination also showed signs of neurologic distress (Mingazzini 1, 2) so she was scheduled for coagulative screening, supraortic chords Doppler and EEG. An anti-antihematogenic 10% glycerol intravenous infusion was administered. Angiologic examination and EEG revealed no abnormalities.

Since a CT Scan could not be performed, due to the patient's pregnancy, a magnetic resonance scan was done, showing an expansive angiomatous lesion of the third median anterior of the corpus callosum. She was scheduled for a caesarean section to reduce the risk of rupture of the angioma, and discharged. The clinical situation remained unchanged with no other sign of neurologic distress and good gestational evolution.

At the 39th GW the patient underwent elective caesarean section under peripheral anesthesia by association of continuous epidural thoracolumbar block and lumbosacral subarachnoid block.

This association provides a progressive induction of epidural analgesy while keeping sudden pressure changes at a minimum.

Epidural block was provided from T8 to L2 while a low dose subarachnoid block was effective from T10 to S4 metamers thus achieving greater pain relief in T10-L1 (segments with higher antalgic involvement) together with a good analgesia in the metamers with lower surgical involvement. Patient preparation was done in 90 minutes.

After introducing a 14 G intravenous needle into the right basilic vein, 250 mg of dyntoine were administered and a 1500 ml infusion (16 ml/min) composed of 500 ml Colloids — and 100 ml Crystalloids — (Ringer's Lactate) was initiated.

Cardiocirculatory cardiotocographic and peripheric arterial saturation were monitored throughout the procedure by non invasive techniques.

Immediately afterwards a continuous epidural catheter was placed via an 18 G needle in the interspace between T12 and L1 with localization of its extremity in T10-T11 (3 cm deep vertebral insertion). The patient was placed in supine position with intermediate rotation to the left.

After 30 minutes from the beginning of preparation analgesia was induced by 0.5% 50 mg. Bupivacaine in 5 mg increments every 5 min. During this phase and in the following 10 minutes no relevant changes in arterial pressure were registered (range 10/70 HG). Cardiotocography and oxygen saturation were also normal.

After 90 minutes the patient was placed on the operating bed in the Trendelemburg position and a slight left rotation of the body. Subarachnoid blockage was initiated by injecting 10 mg hyperbaric bupivacaine in the L1-L2 interspace by a 27 G needle. After five minutes sensory blockage reached the T10 level and surgery was allowed to begin.

A male infant (gr 4560, cm 52) was delivered after the 3rd minute of skin incision (Apgar score was 9 and 10 at 1 and 5 minutes, respectively).

During the 30 minute Caesarean section, Colloid and Crystalloid solutions were infused 1500 ml total) to compensate blood loss (700 ml) and urine output (400 ml). No other pharmacologic support was necessary, due to optimal anesthetic management and because hemodynamic conditions were always within normal range.

The selected anesthesiologic technique caused no complications in the postoperative course. Close neurologic follow-up by objective examination and EEG did not show any neurologic deficit. As a precautionary measure, 250 mg - 3 dyntoine prophylaxis (antiepileptic) was applied after surgery.

The patient was discharged on the 8th day with a strong recommendation to avoid any psycho-physical stress and was referred for admission to the neurologic department to perform other investigations and a cranial CT scan and for definitive treatment of the cerebral lesion.

She was admitted to the neurosurgical department on March 26, 1992. As surgery was regarded as too risky, instrumental and objective findings led to tentative embolization (after carotidogram) which was also soon abandoned. The lesion was by then diffused to the whole anterior third of the corpus callosum and a cerebral angiogram revealed that it was supplied by the right anterior cerebral artery. The patient was therefore referred for radiosurgery to the radiosurgical department of Vicenza Hospital. After sterotactic localization, 30 GY in one session were supplied by means of a 6 MN linear accelerator. The first CT scan after radiosurgical treatment showed a reduction in size.

Close radiologic follow up is now strongly recommended as the therapeutic effects and radiotherapy become apparent after a 6/24 month period.

DISCUSSION AND CONCLUSIONS

Neurological examination is recommended in pregnant women presenting seizures and/or cephaleas, especially when associated with vomiting and psychological alterations ([3]). The investigation can be performed using either CT scan or Magnetic Resonance scan. Acute hemorrhages, which are a frequent complication of artero-venous malformations are easily revealed by CAT but this technique should be avoided in pregnancy. MR scan can define the lesions size and shape much better (especially the small ones) even without dye infusion and also allows to perform angiograms.

RMN does not use ionogenic rays and is therefore to be considered the method of choice for neurological examination in pregnancy.

Given the scarcity of reported cases, the management of labour and delivery can very considerably.

According to some Authors these patients should ideally be managed by a continuous caudal or lumbar peridural anesthesia during labour and delivery should be by the vaginal route, unless caesarean section is obstetrically indicated ([3, 10, 11]).

Elective caesarean delivery has been advocated by others to keep intracranial pressure at a minimum 1,2.

In the observed case the pregnancy was also complicated by ecographically documented cephalopelvic disproportion so that the choice of the abdominal route was mandatory. As we have already stressed before, vaginal delivery is only justi-

fied when there is no risk of dystocia, even at a minimal level.

The anesthesiologic management in this case had to take into account the peculiarly risky situation in which surgery had to be performed. The arterovenous malformation constituted an important anesthesiologic risk factor.

Literature data indicates that rupture of arterovenous malformations is 4 times more frequent in pregnant women ([12, 13, 14]).

The main risk are:

1) *AVM rupture* due to intubation procedures, acute increase of arterial pressure, difficult venous return (Trendelemburg) mediastinal pressure increase;

2) *thrombization* due to hypotension/hypoperfusion circulatory slowing and changes in hematopexis values for rebound hypercoagulability after massive hemorrhage during surgery;

3) *epileptic episodes* following intracranial pressure increase of hyperventilation ([12, 13, 14]).

In summary, on the basis of the Authors' clinical experience, regional anesthesia for Caesarean section in patients with brain artero-venous malformations can be given in safety provided it is performed with a carefully planned time schedule and sequences, and with reliable haemodynamic monitoring.

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