

Managing pregnancy in women with ventriculoperitoneal shunt: a review of the literature

Biomedicine and Surgery

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ABSTRACT

The ventriculoperitoneal (VP) shunt is an effective and mainstay treatment for hydrocephalus and since its introduction in 1971, the number of hydrocephalus patients reaching reproductive age has increased. There are still doubts about management of these pregnancies, especially when it's about mode of delivery. The article aims to provide an overview of the current issues associated with the management of the patients with VP shunt. The emphasis is on proper care of these patients including multidisciplinary management throughout pregnancy, delivery and maternity, as well as on intensive medical consultation when planning pregnancy. Evaluation by both neurosurgeons and obstetricians, along with MRI images, should be performed before pregnancy. Vaginal delivery with, if needed, shortened second stage of labor is preferred in women without absolute neurosurgical indication, acute neurologic condition or concrete obstetrical indication. In cases of obstetrical indications and with symptoms of increased intracranial pressure, the caesarean section is required.

KEYWORDS: caesarean section; spinal anesthesia; vaginal delivery; ventriculoperitoneal shunt

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INTRODUCTION

With the advancement of medicine, diagnosis and treatment of certain conditions, nowadays many women burdened with disease that in the past has been incompatible with motherhood, enter into the reproductive age.

In this article, we are focused on managing pregnancy and delivery in pregnant women with a ventricularoperitoneal (VP) fluid shunt, and we'll try to summarize the directions founded by reviewing literature. It is mainly about women to whom shunt was placed due to congenital hydrocephalus of unknown origin, postmeningitis hydrocephalus or pseudotumor cerebri.

Among the papers we have studied in the literature, four papers were representative. Two of them were case reports and the other two analyzed the outcomes of pregnancy in a larger number of patients.

Buresec et al. (1) present a case report of a 32-year-old pregnant woman with VP shunt who had no neurological complications during pregnancy. In the 40th week of pregnancy, she spontaneously entered the delivery and under the epidural analgesia, with mediolateral episiotomy and vacuum extraction, she delivered a healthy eutrophic male baby with birth weight 3020 grams and length 48 cm. There were no complication considering postnatal period either from the mother or from the infant. The mother received antibiotic prophylaxis for cephalosporins (three doses in the first 24 hours).

Haeussler et al. (2) present three cases from their practice. The first relates to a 22-year-old patient whose first delivery was vaginal birth. Due to the protracted course of labor complicated by the persistent dorsoposterior position of the baby, the episiotomy and the vacuum extraction were necessary and a healthy eutrophic baby weighing

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3420 grams, APGAR 9,10,10 was delivered. The second delivery of this patient was a primary low transverse caesarean section that had to be performed because of the personal reasons motivated by the experience of first delivery. The second case describes a 24-year-old patient to whom, because of the high longitudinal position of the baby and due to inadequate engagement of the head after induction of oxytocin infusion, a caesarean section was performed and a healthy baby weighing 4050 grams, APGAR 9,9,10 was delivered. The third case describes a patient who spontaneously vaginally gave birth to a healthy baby weighing 2860 g, APGAR 9,9,10.

Landwehr JB Jr et al. (3) analyzed the outcome of pregnancy in 8 patients with VP shunt. There were 25 pregnancies with the following outcomes: two elective abortions, five spontaneous abortions, two preterm vaginal deliveries, one mid-forceps rotation, two primary low transverse caesareans, two repeated low transverse caesareans, and 11 spontaneous vaginal deliveries. Among 18 deliveries, 13 of them were vaginal, four caesareans and one delivery with forceps. No patients received antibiotic prophylaxis during delivery. There were no complications considering the VP shunt. Their experience suggested that vaginal delivery had more advantages than caesarean section, when it is about uncomplicated deliveries.

Liakos et al. (4), in collaboration with Hydrocephalus Association, Cleveland, Ohio, have published a paper describing the impact of VP shunt on the outcome of 138 pregnancies in 70 women. Out of the 138 pregnancies, 100 of them were delivered in term, five preterm deliveries (103 pregnancies with two twins), one early preterm delivery of the dead, 30 spontaneous abortions, 2 ectopic pregnancies and 4 elective abortions. Of 105 deliveries, 61 were vaginal, 44 were caesarean sections (13 of them were indicated by shunt complications), and caesarean section was performed in all pregnancy with breach position of the baby.

DISCUSSION

A multidisciplinary approach (5) that involves detecting shunt malfunction complicating up to 25 to 50 percent of pregnancies (6,7) is necessary. Functional occlusion of the shunt most often appears in the third trimester as a result of the rise in intraabdominal pressure caused by the enlarged uterus. Symptoms include disorders of consciousness, irritability, light sensitivity, hyperesthesia, nausea, vomiting, headache, vertigo, migraines, seizures, weakness in the arms and

legs, nystagmus, strabismus, double vision and cranial nerve palsies. In these cases, an emergency evaluation of the condition and consultation with the neurosurgeon is required. Excluding the complications, we actually have a pregnancy that, of course, has to be led more carefully but the vaginal delivery is absolutely preferred in uncomplicated cases (8). Contrary to what is expected, most of the pregnancies in these women were not complicated by the shunt itself. Prenatal, perinatal and postnatal multidisciplinary care was necessary for adequate management and successful delivery.

Preconceptionally, pregnancy should definitely be planned and these women need to be fully evaluated by both neurosurgeons and obstetricians. Before conception, it would be necessary to do CT or MRI to check the size of the ventricle and confirm the adequate shunt function, and to define the question of inheritance of the disease or some other neural tube defect, thus enabling genetic counseling.

Prenatal care is standard consisted of usual prenatal diagnosis and regular ultrasound monitoring. In the second trimester shunt revision should be accomplished and full term delivery could be expected.

Vaginal delivery is definitely preferred (1-4) in pregnant women without neurological complications (disorders of consciousness, irritability, light sensitivity, hyperesthesia, nausea, vomiting, headache, vertigo, migraines, seizures, weakness in the arms and legs, nystagmus, strabismus, double vision and cranial nerve palsies), in women who do not have complications from the shunt itself (obstruction of the shunt or very rare abdominal cyst at the distal end of the catheter), and in those where there are no concrete obstetric indications for the caesarean section.

Vacuum extraction is preferred, with episiotomy, due to a shortening the second stage of labor, in term of reducing the risk of increasing intracranial pressure when pushing. When caesarean section is considered, caution should be great, because of the adhesions expected around the abdominal end of the catheter (9). The recommendation is to deliver in the term but never let it pass.

Antibiotic prophylaxis, in both vaginal delivery and caesarean section, is still not defined (3).

Epidural and spinal analgesia and anesthesia can be applied but with caution (2,10). Epidural analgesia is used to manage the rise in intracranial pressure during painful contraction. Care should be taken with a postural headache after puncture in epidural analgesia, which may be a symptom of a shunt malfunction as well. If necessary, anesthesia can be

combined with a “blood patch” method to prevent the leakage after accidental puncture of the dura (2). During anesthetic procedure there is cerebro-spinal fluid loss followed by low intracranial pressure period. Ventricular enlargement is presented in computer tomography scan. Symptoms are gone with the period of recumbence. Shunt revision or external ventricular drainage is not necessary (11). General anesthesia is preferred to spinal anesthesia by some anesthesiologists because it's relatively safe and could decrease intracranial pressure without the possibility of cerebro-spinal fluid infection (11).

Postpartum integration of mother and child into society depends on the mental impairment of the mother and therefore a multidisciplinary management and team collaboration is priority (12). A high quality care includes the continuous exchange of information between specialists in the way of providing proper medical consultation, educational measures and social welfare.

CONCLUSION

Doing detailed and critical review of the literature, we've concluded that vaginal delivery is preferred in women with noneurological complications (disorders of consciousness, irritability, light sensitivity, hyperesthesia, nausea, vomiting, headache, vertigo, migraines, seizures, weakness in the arms and legs, nystagmus, strabismus, double vision and cranial nerve palsies), with no shunt malfunctioning (shunt obstruction or very rare abdominal cyst at the distal end of the catheter) and with no concrete obstetric indications. Epidural or spinal analgesia can be applied but with caution. Vacuum extraction is preferred, with episiotomy, due to the shortening of the second stage of labor. When caesarean section is performed, caution should be great, due to the adhesions expected around the abdominal end of the catheter. The recommendation is to deliver in the term but never let it pass.

The responsibility of medical specialists is great, as they are “creating” patients who are capable of experiencing an adult life with all advantages and disadvantages, they need to be aware of great responsibility providing proper treatment and dignified life for those patients.

Women with VP shunt are just one of the challenges a modern obstetrician is facing.

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