

Overview of MOMS

Background of Management of Myelomeningocele Study (MOMS)

MOMS is a research study designed to compare two approaches to the treatment of babies with spina bifida: surgery before birth (prenatal or fetal surgery) and surgery after birth (postnatal surgery). Spina bifida is a complex birth defect in which a portion of the spinal cord and associated nerves as well as the surrounding spinal bones and overlying muscle and skin do not fully develop. At birth the incompletely developed portion of the spinal cord protrudes through the open bones and skin. The incomplete development of the spinal cord can occur anywhere along its length, from the neck to the lower back and results in a variety of medical problems.

One of the most common and important conditions associated with spina bifida occurs because the brain is positioned further down into the upper part of the spinal canal (neck area) than it should be. This abnormal positioning of the brain is part of what makes up a condition called the Arnold Chiari II malformation. This malformation leads to blockage of the normal flow of spinal fluid causing it to collect in the fluid cavities of the brain (ventricles). The condition of over-filled ventricles is called hydrocephalus.

Since the 1930's, the first step in the treatment of babies with this condition has been to surgically close the opening in their back within a few days of birth. The surgery puts the tissues back in their normal position and prevents further damage to and infection of the nervous tissue, but DOES NOT restore function to the already damaged nerves. The second step is usually placement of a thin tube called a shunt within the ventricles which allows for drainage of the excess fluid and relieves undue pressure on the brain. A shunt usually passes under the skin from the head into the abdomen.

Over the years, doctors have noticed that nerve function in babies with spina bifida seems to worsen throughout pregnancy. Often movement in the legs and feet which can be seen by sonogram early on is not seen later in the pregnancy. This suggests that there is ongoing damage to the open portion of the spinal cord, possibly from contact with amniotic fluid. In addition, both animal and human studies have shown that the ability of the body to repair damaged nervous tissue is best in young individuals. Because of these considerations, doctors have been working on ways to close spina bifida defects as early as possible.

In 1994 doctors began trying out various methods for closing spina bifida defects while the baby is still in the mother's womb. Since that time, many improvements have been made in the procedure. It is still not known, however, whether it is better to operate on a baby with spina bifida before or after it is born. MOMS is designed to answer that question. The National Institute of Child Health and Human Development (NICHD), a part of The National Institutes of Health (NIH), has funded this study to compare how babies who have prenatal surgery do compared to those who have postnatal surgery. There are three participating MOMS Centers: the University of California at San Francisco in San Francisco, California, The Children's Hospital of Philadelphia in Philadelphia, Pennsylvania and Vanderbilt University Medical Center in Nashville, Tennessee. The study will be coordinated by the Biostatistics Center of the George Washington University in Rockville, Maryland. The goal is to find out if either treatment is better for the baby.

Clinical Trials

-Overview of a clinical trial

A clinical trial is a strictly controlled study of new therapies and treatments which is done on human beings. Clinical trials can be used to look at the effectiveness and safety of a wide variety of things such as new medications, therapies or types of surgery. In this study we are comparing two approaches to the treatment of babies with spina bifida: surgery before the baby is born (prenatal or fetal surgery) and surgery after the baby is born (postnatal surgery). A clinical trial is done when it is not known which treatment is better.

-Steps to ensure fair comparison of two types of treatment

Several steps are taken to be sure that the two types of treatment under study are judged fairly. Clinical trials are usually randomized. This means that neither the doctors or other staff involved in the study nor the study participants have any control over which treatment group an individual is assigned to. In addition, clinical trials are usually blinded. This means that key personnel involved in evaluating the results do not know which treatment was received by a participant. In this study the participants and the doctors performing the surgery will know whether the woman had surgery before or after delivery, but the specialists who evaluate the progress of the babies will not.

-Safety Concerns

Safety of study participants is always the top priority. Before a clinical trial can begin, the study goals and design are carefully reviewed by a special committee made up a wide variety of individuals including doctors, nurses, social workers, ethicists, community members, and clergy. This committee is called the Institutional Review Board (IRB). No one associated with a specific clinical trial can be on the IRB which reviews that study. IRBs from each MOMS Center and the Biostatistics Center had to approve the MOMS study. Prospective study participants must always be fully informed about the study goals and design, as well as possible risks and benefits, and sign an informed consent form before being accepted into a clinical trial.

Overview of the Study

MOMS is a long-term study which began in early 2003. Two hundred women 18 years of age or older who are carrying babies with spina bifida will be enrolled in the study. They must enroll by their 25th week of pregnancy. Half of the women will be assigned to have prenatal surgery and half to have postnatal surgery. This is a randomized trial meaning that neither the doctors at the MOMS Center nor the women who participate will have a say in whether or not they are assigned to surgery before delivery or surgery after delivery. The prenatal surgery will be done at one of three MOMS Centers between the 19th and 25th week of pregnancy. Women in both groups will deliver their babies at their assigned MOMS Center by C-section around the 37th week of their pregnancy. Women assigned to the prenatal surgery group will stay in lodging near their MOMS Center from the time they are accepted into the study and have the prenatal surgery until they deliver their baby by C-section around the 37th week of their pregnancy. Women assigned to the postnatal surgery group will return home after they are accepted into the study and will be cared for by doctors in their area until they return to the MOMS Center at 37 weeks for delivery by C-section and for postnatal closure of their baby's spina bifida defect by the MOMS team neurosurgeon.

Process for inclusion in the study

-Initial Screening

Interested women or their doctors should call the Study Coordinator at the Biostatistics Center of the George Washington University, to obtain information and to have a preliminary assessment of eligibility. The Study Coordinator can be reached at 1-866-ASK-MOMS. Those who are interested in pursuing enrollment in the study will be sent a package of information about the trial and will need to sign an informed consent form to allow the Study Coordinator to evaluate their medical records and speak with their doctor, if necessary. If after reviewing the medical record eligibility is confirmed, they will be assigned to one of the three participating MOMS Centers. Women will not be able to select which MOMS Center they will be assigned to. Convenience to the women as well as the need to evenly divide the participants between the three centers will be considered when making MOMS Center assignments.

-Final Screening

The next step after the initial screening process is for the woman to contact her assigned MOMS center to arrange a date for an in-depth evaluation. The study will pay for the woman and the baby's father or another support person to travel with the mother to the MOMS Center and meals and lodging will be paid by the study while they are at the MOMS Center. The evaluation is quite extensive and includes:

- A complete obstetrical ultrasound (sonogram)
- An MRI of the of the fetus's head
- A physical examination of the mother and clearance for surgery by an anesthesiologist and an obstetrician
- A social work evaluation
- Teaching about spina bifida and the medical problems associated with this condition
- Teaching about what the prenatal surgery will involve, what to expect after surgery and what type of care will be needed between the prenatal surgery and delivery
- A review of medications which may be necessary before, during and after the prenatal surgery
- A thorough review of the risks and benefits of participating in the study

If the evaluation confirms that a woman is eligible and she chooses to participate in the study, she will be asked to sign an informed consent form and she and the father will complete a brief psychosocial questionnaire.

Randomization and Surgery

This is a randomized study. Assignments to have surgery before birth or surgery after birth will be made by a central computer system. Neither the MOMS Center staff nor the woman will be able to choose which group she will be assigned to. As soon as the evaluation and psychological tests are completed, random assignment to the prenatal or postnatal surgery group will be made.

-Prenatal Surgery Group

Individuals assigned to have surgery before birth will be scheduled for surgery within one to three days of their enrollment. The surgery must be done before the end of the 25th week of pregnancy because there is some information suggesting that the earlier in pregnancy it is done, the better the results may be. Because the surgery will be done so soon after the assignment is made, individuals will not be able to return home once the assignment to prenatal surgery is made. They should come to the MOMS Center prepared to stay until they deliver, around 37 weeks of pregnancy.

-Postnatal Surgery Group

Individuals assigned to the postnatal surgery group will return to their home community for care by their doctors. At 37 weeks, if the baby has not yet been born, the woman and her support person will return to their MOMS Center for delivery by C-section. Babies will have their spina bifida defects closed when they are medically stable, usually within 48 hours. Infants with spina bifida are usually in the hospital for one to two weeks after birth while they are stabilized, have their spina bifida defect closed and undergo a thorough medical evaluation.

Risks of Prenatal Surgery

-Possible Risks to the Mother

- Wound infection after the fetal surgery.
- Intrauterine (in the uterus) infection. If this occurs the baby will need to be delivered right away.
- Amniotic fluid leak. If it occurs, the mother will probably need to be admitted to the hospital to be treated with bed rest and IV (intravenous) fluids. She may need to stay in the hospital until delivery.
- Loss of ability to have more children.
- Significant bleeding during the fetal surgery.
- Side effects from any medications needed before, during, or after surgery. Side effects depend on the specific medications used.
- Complications from general anesthesia. This risk is no higher than for any other surgery requiring general anesthesia.
- Effect on future pregnancies and deliveries. It is recommended that mothers do not labor during future pregnancies and deliver by C-section instead.

- Psychological stress. There are risks of depression in both groups of women. There is the potential for placing a psychological burden on the family because of the demands of the study, including having to stay away from home and the need to travel to the MOMS Center several times.

-Possible Risks to Fetus or Baby

- Further damage to the spinal cord and nerves from the prenatal surgery.
- Prematurity. Fetal surgery can result in early delivery. The earlier the baby is born, the higher the chance that they will have problems associated with prematurity.
- Membrane separation. The fetal surgery may cause the tissues surrounding the baby and amniotic fluid to separate from the uterus causing early delivery or interference with the blood flow to some part of the baby such as an arm or leg.

Follow-up

Once stable, infants will return to their home communities for follow-up by their regular doctors. In addition to care by a pediatrician or family practice doctor, enrollment in a program specializing in the care of children with spina bifida is strongly encouraged. MOMS Center staff will help you locate the program nearest your home.

Children and their parents will return to their assigned MOMS Center at one year and two and a half years of age for evaluation. Motor function and developmental progress will be checked as well as bladder, kidney and brain development. This long term follow-up data will enable us to determine whether the outcome is better with prenatal or postnatal surgery. Follow-up assessments will be done by a team of specialists who will not know whether the child had prenatal or postnatal surgery.

Again, all travel, lodging and meal costs related to the follow-up visits will be covered by the study.