

## Inside the Brachial Plexus Injury Case

Improper handling of shoulder dystocia during birth can result in permanent injury to the baby. Understanding why this complication occurs and what doctors should do about it will help you litigate these complex cases successfully.

Because brachial plexus injuries (BPI) to an infant can result from breaches of the standard of care during childbirth, plaintiff lawyers pursuing medical negligence claims in birth injury cases need to know how BPI arise. Although most BPI are transient, resolving within six months, about 10 percent are permanent and devastating.

Such injuries are most often caused when a health care practitioner exerts excessive force during delivery in an inappropriate response to shoulder dystocia, which is a failure of the baby's shoulders to readily follow his or her head during a vaginal delivery. Thus, the starting point of most BPI cases is determining the presence of shoulder dystocia and showing how its improper management causes BPI.

The brachial plexus is a network of nerves that emanate from the upper spine and travel through the neck, shoulder, and arm to the hand. Damage to these nerves may cause simple loss of sensation over portions of the affected arm or complete paralysis of the affected arm, shoulder, and hand.

There are four types of brachial plexus injury, the most severe of which is avulsion, when the nerve roots are torn out of the spine. Rupture occurs when the nerve is torn but remains attached to the spine; neuroma, when the torn nerve heals improperly with formation of scar tissue; and neuropraxia, when the nerve is stretched but not torn.

Shoulder dystocia occurs either when the baby's anterior shoulder is trapped behind the mother's pubic bone (the most common presentation) or when the baby's posterior shoulder becomes trapped in the hollow of the mother's tailbone. To dislodge the baby's shoulders, practitioners can use the following maneuvers, listed in order from most to least commonly used; each should be documented in the medical record, along with the outcomes:

**McRoberts maneuver**- the mother's legs are hyperflexed back on her abdomen to increase the space between the pubic bone and sacrum, which should allow the baby's shoulder to drop below the pubic bone.

**Suprapubic pressure**- the practitioner applies downward pressure at a 45-degree angle in an attempt to rotate and push the entrapped shoulder below the pubic bone. This is acceptable practice when performed low on a mother's abdomen; fundal pressure, performed high up on the abdomen, is contraindicated.

**Woods/Rubens maneuver**-the practitioner places a hand internally against the baby's anterior or posterior shoulder and rotates the baby.

Posterior arm sweep-the practitioner reaches in and pulls the baby's posterior arm out and the shoulder after, thereby releasing the anterior shoulder.

**Episiotomy-** It is controversial whether this procedure helps or not.<sup>1</sup> Zavenelli maneuver-a rarely used technique in which the practitioner pushes the baby's head back into the vagina and performs an emergency cesarean section.

Symphysiotomy-another rarely used technique in which the practitioner surgically divides the mother's pubic bone in half to release the baby's shoulder.

The standard of care requires the practitioner to know how each of these techniques is performed and when to use it. When shoulder dystocia occurs, the patient's medical records should document exactly which maneuvers were used and the result.

### **Risk Factors**

A number of factors place a baby at risk of shoulder dystocia during labor and delivery:

Fetal macrosomia, or an excessively large baby maternal diabetes, which may be preexisting or may be acquired during pregnancy maternal obesity, determined by the mother's body mass index a history of prior vaginal deliveries postterm gestation history of delivery of a macrosomic infant history of shoulder dystocia induction of labor precipitous second stage of labor, from full dilation (10 centimeters) to delivery, causing the baby's shoulders to improperly rotate, fold inward, and become trapped behind the mother's pubic bone abnormalities of the active phase of labor, from 4 to 10 centimeters dilation, including failure to progress to full dilation and/or the administration of drugs to complete this phase epidural anesthesia use of forceps or vacuum extractor, in what is called operative vaginal delivery A doctor's duty is to look at the entire picture, explain the risk factors to the parents, and allow the parents to make an informed decision between a cesarean section and vaginal delivery. Usually, more than one of these risk factors is necessary to instigate the duty of informed consent. For instance, a history of prior vaginal deliveries is a very low risk factor and would not require informed consent on its own. However, combined with a macrosomic baby, the doctor's duty to inform the patient of the risks would then arise.

The American College of Obstetricians and Gynecologists (ACOG) says that except for maternal diabetes and macrosomia, the predictive value of risk factors for shoulder dystocia is not high enough to be used in a clinical setting.<sup>3</sup> However, documentation of prenatal risk factors can put a health care provider on notice of a potential problem.

If risk factors other than diabetes or macrosomia are present before the baby is born, evidence of this can be used at trial to show a doctor should have been prepared to encounter shoulder dystocia. Remember, it's not that a doctor is obligated to order a cesarean or even recommend one in such instances; the obligation is to obtain informed consent from the parents about the implications of each procedure and to allow them to make the decision about how to proceed.

Fetal macrosomia is one of the most important risk factors. The fundal height (the distance from the pubic bone to the top of the uterus measured in centimeters) is recorded at each prenatal visit. The number of centimeters should

correspond to the number of weeks of gestation (for example, 20 centimeters in the 20th week of pregnancy). A deviation greater than two centimeters requires further investigation to determine estimated fetal weight accurately.

At a minimum, this requires an ultrasound exam. If the mother weighs more than 200 pounds during her pregnancy, serial ultrasound exams should be carried out, as clinical estimates tend to be inaccurate.

However, ACOG focuses only on the estimated fetal weight. Indeed, its new guidelines say that, to avoid the risk of shoulder dystocia, practitioners should consider offering an elective cesarean section when the estimated fetal weight is 4,500 grams (9.9 pounds) in diabetic mothers and 5,000 grams (11 pounds) in nondiabetic mothers.<sup>4</sup> Most practitioners will say that any estimated fetal weight below these limits does not meet ACOG criteria and thus does not warrant special consideration.

This reasoning is flawed because the estimated fetal weight determined by ultrasound at the end of pregnancy can be wrong by 10 percent or more.<sup>5</sup> When the estimated fetal weight is within 10 percent of ACOG guidelines, the practitioner should have a discussion with the patient about the risks and benefits of cesarean section and vaginal delivery. To neglect to do so is failure to elicit informed consent.

ACOG ignores other sonographic measures that are highly predictive for macrosomia and shoulder dystocia. One study showed that a fetal abdominal circumference of more than 35 centimeters predicted macrosomia in 93 percent of cases.<sup>6</sup> Another study demonstrated that a difference between fetal abdominal diameter and head diameter of 2.6 centimeters or more in diabetic mothers was highly predictive of shoulder dystocia.<sup>7</sup>

Look for these measurements in the prenatal ultrasound reports. Even though ACOG doesn't acknowledge use of these markers, plaintiff lawyers can argue that the medical literature supports their use, and thus well-informed obstetricians should be aware of them.

Gestational diabetes (diabetes in pregnancy) is an equally important risk factor for shoulder dystocia, and all pregnant women should be tested for it. For women with normal prepregnancy weight, the test should be conducted between 24 and 28 weeks' gestation; for women with a prepregnancy weight of more than 200 pounds, the test should be conducted in weeks 1 through 12.

Check these test results carefully for glucose intolerance. Although ACOG states that a result up to either 130 or 140 mg/dL on the gestational diabetes test is acceptable,<sup>8</sup> 10 percent fewer gestational diabetics will be diagnosed if the cutoff of 140 is used.<sup>9</sup>

Any result between 130 and 140 indicates sugar intolerance, a known risk factor for fetal macrosomia. In addition, results of the mother's urine dipstick tests for glucose, recorded at each prenatal visit, may yield important clues, because the presence of glucose in urine indicates glucose intolerance.

Do not overlook the mother's obstetrical history. Typically, subsequent children have a greater birth weight than their older siblings. Question the mother about the birth weights of all her children and ask whether any had difficult deliveries or suffered from BPI. The practitioner should also have elicited this information.

### **Dystocia Diagnosis**

In most cases involving severe brachial plexus injury, a shoulder dystocia diagnosis is easily found in the delivery record. For undocumented dystocias, careful analysis of the nursing and pediatric notes will usually provide important clues.

In the obstetrical team's notes, which include the nurse's and pediatric notes, look for any reference to "suprapubic pressure," "hip flexion," "McRoberts," "fundal pressure," or "traction." These procedures are not routinely performed in an uncomplicated delivery and can indicate the presence of dystocia.

When obstetricians encounter shoulder dystocia, their first step is to call for help. This includes getting extra obstetrical nurses, residents, and the pediatric team, the latter of whom are rarely present at an uncomplicated vaginal delivery. (Typically, a normal delivery includes only one nurse or assistant besides the obstetrician.) Examine every note in the patient's record for evidence of a difficult delivery; during discovery, elicit the reason for extra medical practitioners at the delivery.

Family members who were present during the delivery can also help determine whether shoulder dystocia occurred. Ask them detailed questions about what they remember, including how many nurses and other medical personnel were present and what they were doing.

Family members may be able to say whether the medical team pushed on the mother's abdomen or pubic area and, if so, whether the pressure was exerted high on the abdomen or down low. They may also be able to remember how many people were holding the mother's legs and in what position; how long the interval was between delivery of the baby's head and that of the rest of the body; and whether traction was applied to the baby's head.

The birth of a child is a monumental event in any family, and family members' recollections of it are usually heightened. Most jurors will find this testimony extremely credible. Also ask family members whether they took videos or photographs during the delivery. These may be the best evidence in your case.

### **Physician-caused Dystocia**

When the baby's shoulder becomes entrapped in the mother's pelvis, it is usually because the baby is too large to pass through. However, the practitioner can also enhance entrapment by using forceps or a vacuum extractor.<sup>10</sup> When the practitioner uses these tools, he or she accelerates the descent of the baby through the pelvis, preventing the normal folding and rotation of the shoulders and creating shoulder dystocia.

Whether the use of forceps or vacuum extraction is key to your case depends on the reason they were used. The delivery record or the delivery notes should list the reasons, which could include:

shortening the second stage of labor, usually for the practitioner's own convenience responding to fetal distress arrest of the second stage of labor because the mother is unable to push the baby out-also called the baby's "failure to descend"

### **Relieving Maternal Exhaustion**

Of these, fetal distress is the only indication relatively immune to challenge in a BPI case, because the need to deliver the baby as soon as possible to avoid fetal brain damage or death outweighs any increased risk of shoulder dystocia caused by the use of forceps or vacuum extractor. Check the fetal monitor strips (produced by a machine that tracks the fetal heart rate during labor) to confirm the diagnosis of fetal distress. Once it is confirmed, you need to show that improper techniques were used to relieve the shoulder dystocia, causing BPI.

The defense will often claim that the reason a practitioner used forceps or vacuum extraction was arrest of the second stage of labor. In such a case, you must establish the baby's "station"-or how far the baby's head has descended in the pelvis (measured in centimeters, relative to the ischial spines of the pelvic wall)-before an instrument was used. Anything above a station of +2 is considered a mid-pelvic delivery, meaning the baby was too high in the birth canal for the use of forceps or a vacuum extractor.

Check the medical records to be sure the fetal station was correctly documented and at least 30 minutes passed with no change in the station. Be sure the station was +2 or greater, as anything less would not justify the use of instruments.

Be aware of recommended guidelines for the length of the second stage: A first-time mother, for instance, should push for at least two hours and no longer than three before failure to descend is diagnosed; a repeat mother should push at least one hour and no more than two before the diagnosis is made.<sup>12</sup> When physical exhaustion is a factor and the mother is physically unable to push, it is important to establish how long she was in labor, how long she was pushing, and the time of day the delivery occurred (the mother is much more likely to be exhausted if the delivery time is early morning, after a night of labor, versus a late-afternoon birth after a daytime labor).

If the practitioner used forceps or a vacuum extractor, the medical record should indicate the number of pulls that were needed to deliver the head. Among other things, the number of pulls necessary to deliver the head is indicative of the size of the pelvis in relation to the size of the fetus. As the number of pulls increases, so does the time required for delivery-therefore, the risk of shoulder dystocia is increased.<sup>13</sup>

Also look in the record for any use of fundal pressure. When applied before delivery of the baby's head, it can cause shoulder dystocia. When applied after dystocia is diagnosed, it worsens the impaction of the shoulder behind the pubic bone and is contraindicated.<sup>14</sup> Use of fundal pressure requires nursing assistance and therefore makes the hospital a potential defendant.

Abnormalities in the first stage of labor, before full dilation and pushing, should put the health care provider on notice of possible problems.<sup>15</sup> Once the mother is dilated four to five centimeters, the progression to full dilation should be roughly one centimeter per hour—slightly slower for first-time mothers and slightly faster for others.<sup>16</sup> Any significant deviation from this or the need for drugs (most commonly Pitocin) during the active phase to intensify contractions should alert the practitioner to possible problems.

### **Using the Literature**

Support for both sides in BPI litigation can be found in the medical literature. Defendants often claim that these injuries are unrelated to, and independent of, shoulder dystocia, citing a 1998 study that concluded that 78 percent of permanent brachial plexus injuries did not involve shoulder dystocia.<sup>17</sup> However, a 1992 study concluded that 100 percent of permanent BPI were a result of shoulder dystocia.<sup>18</sup>

More recently, after examining a large database, researchers concluded that "among permanent [brachial plexus palsies], the rate of shoulder dystocia in both our data sets exceeded 90 percent, confirming the near universal association found in most articles addressing the topic."<sup>19</sup> Regarding permanent BPI not associated with [shoulder dystocia], they noted that "the residual deficit is nearly always mild, whereas nerve root avulsions and/or complete brachial plexus impairment . . . occur almost exclusively with antecedent [shoulder dystocia]."<sup>20</sup> This research is more than sufficient to show that BPI is more likely than not caused by improper management of shoulder dystocia.

In addition, look for inconsistencies in the medical literature. For example, one ACOG article states that the predictive value of most risk factors for dystocia is not high enough to be clinically significant, and therefore elective cesarean section should not be offered to mothers who have them. Later, the same article states that it is appropriate to offer women with a history of shoulder dystocia an elective cesarean.<sup>21</sup> The studies these researchers cite show that other risk factors are just as reliable as a mother's history of shoulder dystocia for predicting dystocia in a current delivery. If the defense uses this study, ask the defense expert why the study treats two similar classes of mothers differently.

Finally, even ACOG acknowledges the increased incidence of birth asphyxia in shoulder dystocia cases.<sup>22</sup> The result of this asphyxia can range from learning disabilities to cerebral palsy with spastic quadriplegia. Many children with serious BPI will present with symptoms of asphyxia before they are a year old, although mild to moderate injuries may not be apparent until some time in the future.

In cases of asphyxia, the amount of time required to dislodge the shoulder and deliver the baby should be documented in the medical records, and an estimate should be solicited from the parents. The longer the baby is stuck, the more likely there will be some brain damage. Pay close attention to Apgar scores and initial descriptions of the baby for signs of depression (low Apgar scores, blue color, respiratory difficulties, floppy tone, need for resuscitation, and prolonged capillary refill). Also check to see if the umbilical cord pH was

recorded and whether it shows metabolic acidosis, which is common with asphyxia at birth.

In addition, examine the nursery records. Seizures often will not be noted in the chart, although seizure-like activity will be. Search for documentation of eye deviation, tongue thrusting, lip smacking, jerky movements, and apneic and bradycardiac spells. Anything out of the ordinary can help establish a claim for asphyxial injury at birth.

### **Preparing For a Trial**

Thoroughly investigate practitioners' histories. Find out where they trained, how many babies they have delivered, how many times they've had to manage shoulder dystocia, how many years they are removed from training, whether they received training for dealing with shoulder dystocia, and how many of the babies they have delivered suffered BPI.

One study demonstrated that practitioners with less than four years of experience were more likely to have adverse outcomes in shoulder dystocia cases.<sup>23</sup> It also showed that practitioners who mismanaged one case were likely to do so again, despite experience. Another study demonstrated the importance of training techniques: Practitioners who were trained on an obstetric birth simulator (an actual model of the female pelvis, complete with fetus) far outperformed those who received standard training (lectures and reading).<sup>24</sup>

If the health care provider recorded the maneuvers used to address the shoulder dystocia, determine how each was performed. Many practitioners perform them incorrectly. For instance, suprapubic pressure should not be applied at a 90-degree angle, which is what some practitioners do; the pressure should be applied at about 45 degrees, perpendicular and toward either pelvic sidewall, relative to the impacted shoulder.

Find out if any member of the mother's prenatal health care team suspected that shoulder dystocia was possible. When the answer is no, proceed to list the risk factors you have been able to identify and ask them why they did not suspect dystocia.

When a practitioner says he or she did think dystocia was possible, ask what preparations were made before delivery. For instance, he or she should have obtained the patient's informed consent about the risks of vaginal birth. Moreover, the practitioner should have made arrangements for extra personnel, including the pediatric team for possible resuscitation of the infant, to be present in the delivery room. When such preparations for the worst have not been made, a strong basis for liability exists.

Consider carefully the experts you need to call. At a minimum, you will need an obstetrician, an occupational therapist, and a rehabilitative specialist (to explain the child's reduced earning capacity). If the child had an MRI or CT scan, a radiologist may be necessary, and if he or she has undergone surgery, a neurosurgeon can testify to the extent and mechanism of the injury. Finally, consider having a life-care planner and economist testify to damages.

Demonstrative evidence ensures the jury will understand the mechanics of the injury. Ideally, have a birth simulator available at trial. Have your expert obstetrician go through the maneuvers of an uncomplicated delivery and one involving shoulder dystocia. Show what the brachial plexus is and how it can be damaged during delivery.

Permanent BPI can be devastating to both the injured child and his or her family- but it is usually avoidable. Thorough preparation and investigation before litigation is the best hope for justice to prevail.

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