CONCERNS ABOUT SINGLE-LAYER SUTURING OF THE UTERUS AFTER CESAREAN SURGERY

by Ina May Gaskin, CPM

In the March 2000 issue of MANA News, I discussed some of the implications of a new surgical technique for stitching the uterus after cesarean surgery, something that has come into vogue in the United States during the last 10 to 15 years. Sometimes called the Misgav-Ladach method, sometimes the Pelosi method, this new technique calls for stitching the uterine incision in one layer instead of the traditional two layers. For most obstetricians in the industrialized world, the two-layer method of closure has been the standard of care for some 75 years.

I first learned of the new technique in a lecture given by Dr. Kurt Benirschke, a retired pathologist and author of the text Pathology of the Human Placenta, at an annual conference of the National Association of Childbearing Centers. He warned that the new fashion of single-layer closure was a probable cause of a dramatic increase in the incidence of placenta percreta and other problems he had observed in the years just before his retirement. He remarked that he had encountered about 10 cases of placenta percreta per year for three consecutive years—an extraordinarily high incidence for what has previously been known as an extremely rare complication (1 in 12,500 births). (1)

When I interviewed Dr. Benirschke in March 2001, he confirmed that he had never before encountered a single case of placenta percreta in his long career as obstetrician and later as pathologist before moving to San Diego. I asked him if he knew of any other pathologists who had made similar observations, and he directed me to Rebecca Baergen, MD, who told me in a phone interview that she was seeing about “one placenta percreta a month” at the New York City hospital where she works.

In all cases of placenta accreta, the elevated maternal mortality risk from hemorrhage has to be considered. With placenta percreta, the most severe degree of accretion, the maternal mortality risk is about 50 percent.

Unfortunately, no published research to date confirms or denies an association between the introduction of the new single-layer closure technique and a rise in the incidence of placenta accreta.

Benirschke’s warning immediately reminded me of two cases of maternal death from placenta percreta, which I learned about from obstetrician friends. When I informed them about Benirschke’s thoughts, they reverted to the two-layer method of suturing, recalling that older professors during their residency had cautioned that the new method was not going to make as strong a scar as the traditional suturing technique. Benirschke remarked that in several of the uteri he examined after a pregnancy following a previous single layer closure, he found that the myometrium had not regenerated at the incision site. In several cases, there was only a window of connective tissue that made up the scar.

Surgeons who find no reason for concern regarding the single-layer technique point out that it has been used for years in other forms of abdominal surgery without posing additional problems and that it may, in fact, be associated with a lower risk of abdominal adhesions following surgery. However, this view disregards the very different anatomy and function of the uterus as compared with intestines, for instance. The uterus is the only abdominal organ that undergoes such a rapid and drastic change in size following surgery, and it is the only one which involves the implantation of a placenta fed from the mother’s bloodstream, thereby posing the risk of massive hemorrhage in the case of implantation problems.

Placenta percreta is not one of those conditions that can always be ameliorated by high-tech obstetrical treatment. It can only be prevented; and the best way we can prevent it is to return to the traditional way of suturing the uterus, while well-designed retrospective studies are carried out to analyze why the incidence of this major complication seems to have risen.

Increase in Risk of Uterine Rupture

An abstract of an oral presentation from a U.S. obstetrical symposium was published early in 2001, pointing to another problem with single-layer closure of the uterus. Bujold and colleagues sought to determine whether there was a greater risk of a uterine rupture during a trial of labor after a prior low transverse cesarean delivery among women who had had single- versus double-layer closures of their uterine incisions. They performed a retrospective study of 1,649 women from Montreal, in which they controlled for maternal age, neonatal birth weight, gestational age at delivery, use of epidural, induction of labor, use of oxytocin for augmentation, prior vaginal birth and prior cesarean for arrest disorders. The authors found that the rate of uterine rupture was 3.1 percent in the single-layer closure group and 0.6 percent in the double-layer closure group. The adjusted odds ratio was 4.02 and was significant. In other words, the chance of uterine rupture in the single-layer closure group was five times that of the double-layer closure group. (2)

The publication of this abstract was enough for the chairman of Maternal Fetal Medicine at Yale-New Haven Hospital Center to announce that single-layer closure of the uterus should be abandoned until there is more convincing evidence of its safety.

Gretchen Humphries, the veterinarian and VBAC mother whose article dismissing my concerns about single-layer closure was published in Midwifery Today (issue 57), does not seem to have been aware of the Bujold study when she wrote her article. Given the fact that she had a good outcome from her vaginal homebirth of twins after a previous cesarean with single-layer closure, I’m reasonably certain that she’s glad that she didn’t know about the apparently increased risk that is associated with single-layer closure when she had her babies. Sometimes ignorance can be bliss. But that does not mean that every woman will be so fortunate as she was.
Incidentally, there are problems with applying studies involving animals to human behavior. Some Turkish obstetricians carried out a study involving 30 pregnant ewes, dividing them into two groups. All of the ewes underwent cesarean surgery. In one group of 15, the uterine incision line was sutured and the abdominal wall was closed in the usual fashion; in the other, the uterine incision was left open and only the layers of abdominal wall were sutured. Four months later, all of the ewes were slaughtered and examined by a pathologist who knew nothing of the study. His findings were that the ewes whose uteri had not been sutured had significantly less muscular necrosis and endometriosis than those whose uteri were sutured. The obstetricians concluded on the basis of the 15 ewes observed with non-closure of the uterus that there was no adverse effect on the immediate and late postoperative period in ewes. They went on to suggest that lower uterine incisions can probably be left unsealed in women.

Other obstetricians discussing this study point out that ewes typically have much easier labors than human females, as ewes often deliver after only two or three perceptible contractions. At any rate, one said, in the case of ewes, there is no husband who will sue the obstetrician if the patient dies.

Lack of Research

The Cochrane Database of Systematic Reviews 2000 found only two randomized trials meeting their criteria in comparisons of single-layer closure to two-layer closure in women with previous cesareans. The two studies involved just 1,006 women, of whom, it is important to remember, fewer than half had single-layer closures. (3,4) One of the trials showed that single-layer closure saved 5.6 minutes of operating time. Fewer sutures were required. The other trial had only a single outcome measure: radiographically determined scar defects at three months. (3) The Cochrane Database found the methodology of this trial suspect, commenting “even if this finding is confirmed, its significance is not known.” (5)

Let’s look at the numbers of women involved in studies about single-layer suturing. Hauth et al studied 83 women with single-layer closure, while Lal and Tsonmo studied 50. Chapman et al followed 67 of the same women Hauth had previously studied in their next subsequent pregnancy.

(6) While this research is better than nothing, it is certainly not a large enough body of data on which to base a widespread change in surgical practice.

Keeping in mind the paucity of research on the outcomes of single- versus double-layer closure, I want to bring up the comments of a U.S. obstetrician during a recent Internet chatroom discussion among obstetricians, gynecologists and general surgeons doing gynecology from many parts of the world. He remarked that a small rural hospital that referred to his large teaching hospital suddenly began sending them problem cases of bleeding and failure of healing. These cases mystified him and his colleagues at the larger hospital until the rural hospital informed them of their change in technique to single-layer closure. When they changed back to double-layer closure, there was “no further trouble” with bleeding problems and failure of the incision to heal. Like me, this obstetrician thinks it unethical to radically change surgical technique when there has been almost no research to ascertain the safety of the new method and when women have not been informed that they are experimental subjects.

Why the Shift in Technique?

Younger obstetricians and residents have told me that they are often pressured to use the single-layer method instead of the traditional method. Why? A few articles recently published in trade publications such as Contemporary OB/GYN and OBG Management have strenuously promoted single-layer closure and related surgical techniques. (7,8,9) These articles are not research studies; rather, they are opinion pieces with references, written by physicians who are considered to be experts in their field by the editorial staff of the magazines. Some excerpts drawn from these articles give an idea of how energetically these publications have pushed forward the idea of changing cesarean surgical technique in spite of the inadequate research base on the subject:

- “More [stitching] is not necessarily better. As the authors explain in their review of the literature, a greatly simplified closure strategy for cesarean deliveries may lead to the most favorable outcomes.”
- “We, as well as other researchers, have found less pain and fewer adhesions in women who undergo this method of cesarean section.”

The Misgav Ladach* method enables the mothers to recover faster and to look after their babies, making the procedure as close as possible to natural childbirth. (* A method involving a new incision method, single-layer closure, and leaving the peritoneum open rather than closing it)

Practically speaking, it is not really hard to guess why the new cesarean technique so quickly came into vogue in the United States during the 1990s. Policy decisions here often hinge more on purely economic factors than what is best for public health. Most of the few studies that have measured any outcome following single-layer closure have agreed that less suture material is required, that operating room time is significantly reduced and that there is sometimes a shorter hospital stay for the woman with single closure. All of these factors at least point to cost savings for HMOs and hospitals, if not greater safety for women undergoing cesarean surgery.

VBAC at The Farm Midwifery Center

My partners and I at the Farm Midwifery Center (FMC) have been attending out-of-hospital vaginal births after cesarean for more than twenty years. More than ninety-eight percent of the 115 women who tried for a VBAC with us managed to give birth vaginally. Only two women required transport to hospital during labor because we suspected dehiscence and, possibly, an impending rupture. Each had her baby by cesarean, and neither did rupture her uterus. All of the babies whose mothers attempted VBAC with us had good outcomes. My partners and I believe that our good outcomes are partly due to the fact that none of the women's labors was augmented with oxytocics. At this point, we have no idea how many women we have helped with VBAC who had a previous single-layer closure, since we were not able to obtain each woman's operative record. I do know that we provided care for at least one woman whose previous cesarean was a single-layer closure.

It is worth mentioning at this point that not every operative record can be trusted to be accurate. Several obstetricians have told me that residents who were not present during the surgery are often the ones who write up the operative report and that they may not know in how many layers the uterus was closed. If these obstetricians are correct.
(and I have no reason to disbelieve them), we who attend out-of-hospital VBAC labors should probably rule out cases in which the placenta overlies the uterine scar, no matter what the operative report says about the method of suturing. At the very least, we should determine whether or not there is any accretion of the placenta in these cases and plan accordingly.

My aim in writing about single-layer closure of the uterus is not to make it harder for women to have VBACs. It is unfortunate that the information about single-layer suturing came to light during a time when many obstetricians are less likely to provide support for women wanting VBAC than a few years ago. My purpose is to expand midwives' knowledge about current surgical techniques so that we can better help women who have hard choices to make (given the complexity, controversy and confusion surrounding many of these choices) during their reproductive years. In addition, I want women to know that there is more than one way of performing a cesarean and that the older way has been better researched than the newer way. If I were facing a possible cesarean myself, I would want my uterus to be stitched in two layers. I certainly would not want someone else to make that choice for me. Finally, I want to encourage those of us who attend out-of-hospital VBACs to become so attentive that we don't miss a case of placenta percreta (or the two lesser but still serious placenta pathologies: placenta increta and placenta accreta) as we consider which women are appropriate candidates for out-of-hospital VBACs. I do recognize that the concerns I have expressed may make it more difficult for some women to choose an out-of-hospital first VBAC. For this I am sorry, but I still don't consider it ethical to withhold knowledge so important to women's safety during labor from them, knowing what I now know.

I have to say that I find it uncomfortable to be aware of maternal deaths from causes that have yet to come under serious consideration from the obstetric research community. We aren't supposed to pay attention to anecdotal reports of maternal deaths, and yet these are the very reports that may be necessary to stimulate the research that should have been done before there was a widespread change in cesarean surgical technique. With this in mind, I will add that I know of two additional maternal deaths associated with single-layer closure besides the two I mentioned above. One of the latter two, like the two already mentioned, was due to a profuse hemorrhage following placenta percreta. The second death was from a slow internal hemorrhage from incision site. (This sounds something like the "bleeding problems" mentioned by the obstetrician discussing the change of technique at the rural hospital in his area.) All four deaths took place in hospitals where the women were giving birth.

If the four women whose deaths I am aware of had died in the UK, it is quite possible that single-layer suturing would have been halted until ethical, systematic trials found it less risky than the traditional method. This is because the UK has a system of "Confidential Enquiries" into the causes of all maternal deaths (and a system of reporting maternal deaths). This is so much more thorough and accurate than its U.S. equivalent that we in the United States should be ashamed of what we currently have. Imagine being able to walk into a bookstore and buy a large, detailed book every three years entitled Why Mothers Die. (10) (In the United States, we are lucky if we get five or six pages from the CDC on maternal mortality every ten years that ordinarily remains buried in medical libraries.) This is how much more the UK system values women's lives than we currently do here in the United States, where by the CDC's own admission, the underreporting of maternal deaths is "massive." The CDC estimates that the number of deaths between 1982 and 1996 was 1.3 to three times that reported in the vital statistics records. (11)

Protocols for Out-of-Hospital VBAC
When I first wrote about this subject, I suggested we at the FMC would not accept clients for VBAC who had a previous single-layer closure after cesarean. After further thought and discussion, we have revised this protocol. We try to get operative reports for the cesarean so that we know what type of incision and what type of closure was used. We now rule out out-of-hospital VBACs for:
- women who had previous classical incisions
- women whose placenta overlies a previous uterine scar
- women who have had more than two previous cesareans

As for previous single-layer closure and the risk of uterine rupture, we take seriously the heightened chance of rupture in the next pregnancy found in the Montreal study, but we accept that a woman who has already had a successful VBAC has a scar that has passed the test. While it is possible that this risk would be considerably less in a population of women whose labors will be neither induced nor augmented, no data currently exist to test this hypothesis. To be on the safe side, we prefer to attend women in a hospital in their first labor following a cesarean with single-layer suturing. After a good outcome in this situation, we feel alright about an out-of-hospital VBAC in a future pregnancy for the same woman. We at the FMC will continue to attend VBACs as long as women want them. What has changed with us is that we must rule out a placenta implanted over a previous uterine scar. If we discover a case of placenta accreta (increta or percreta) by ultrasound (we never have), we will arrange for further care with the most highly skilled obstetrician we can find.

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References: