The Suture Debate

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Starting from within the midwifery community, there is a growing debate over the technique used to close the uterus after a cesarean section and whether that technique has any bearing on the safety of a future vaginal birth. The controversy is defined not only by the research but also by the opinions of some prominent U.S. midwives. Rather than assuming that anecdote is enough reason to limit the birth choices of a woman planning for a pregnancy and birth after a cesarean, a look at the research provides a better understanding of the issues.

The lower segment incision used in most cesarean sections can be closed in two different ways: a single layer of sutures can be used to pull the edges together and then individual, smaller sutures are used to stop any continued bleeding or pull together areas that aren't well opposed. Or, the incision can be closed with two layers of suture – the first pulls the cut edges together and then the second, called an "imbricating pattern" pulls uncut tissue together, on top of the first suture layer. Historically, the double-layer technique was used in the U.S. until the early 1990's, when the single-layer technique came into use. In Europe, the single-layer technique has been used for decades. A great deal of research was done to measure how recovery in the immediate post-operative period compared and the data showed overwhelmingly that women with a single-layer closure had fewer complications post-surgery. Thus, the technique won approval in the U.S. and soon came into use.

There are two potential longer term complications which have been potentially linked to the type of uterine closure: uterine rupture and abnormal placentation, specifically placenta accreta, a condition where the placenta implants too deeply into the uterine wall. Both of these conditions are potentially life-threatening for both mother and baby and require surgical intervention. What hasn't been made clear at this point is whether linking these to the specific type of uterine closure is appropriate, in spite of the anecdotal evidence put forward by some.

Two smaller studies were published in the U.S., in the 1990's.1,2 Neither showed any increase in long-term complications associated with a single-layer closure but both had very small samples and so may have missed a significant but small increase in adverse events. In 2002, Bujold et al. published a study with a much larger sample size.3 The researchers found a significant increase in the uterine rupture rate with a single-layer closure (3.1% vs. 0.5%). They looked at 489 women with single-layer closures and 1491 with double-layer closures. They controlled (statistically) for the possible affects of pitocin, epidural use, age and other potentially confounding variables. The conclusion drawn was that there was a significantly higher risk of uterine rupture in women who'd had a single-layer closure of the uterus in a prior cesarean.

The publication of this study set off a firestorm within the VBAC community. It was confirmation of the belief of some midwives that women with single-layer closures should not be "allowed" to plan out-of-hospital births, or even should not be "allowed" to plan vaginal births at all. In conjunction with the increase in hospitals refusing to provide VBAC services, many women now find their choices limited to a repeat cesarean or an unassisted birth. Because most of the research on longer term outcomes was published in Europe, many of them in foreign languages, there was no real attempt to corroborate or refute Bujold, et al., even though some of the European studies appear to have sample sizes as large as or larger than that of the Bujold, et al. Study.4,5,6,7,8

In 2003, Durnwald et al. published a study which looked at both uterine rupture rates and other causes of perinatal morbidity, including abnormal placentation.9 They did not find an increased uterine rupture rate with single-layer closure. The uterine rupture rate for single-layer closures was 0% and for double-layer closures was 0.8%. The study group included 267 women with a single-layer closure and 501 with double-layer closure. This is a smaller group than analyzed by Bujold et al. but was large enough to detect the rates of uterine rupture seen by Bujold et al. Durnwald et al. quantified other issues as well; there was less postoperative morbidity (infection, blood loss, etc) with the single-layer closures group, as had been found in many previous studies. 4,5,6,8,10,12,13,14,15,16,17 The only "problem" with the single-layer group was a higher incidence of benign "windows" (dehiscences) and these were noted to be non-clinically relevant. There were no previa or accreta noted in either group, a finding which confirmed those of 2 earlier studies.2,6

After looking at all the available information on this topic, we are left with the conclusion that it is unclear as to whether uterine rupture rates are impacted by uterine closure techniques. Out of eleven published studies which looked at uterine rupture or scar integrity, only one showed an increase in uterine rupture associated with single-layer closure.1,2,3,4,5,6,7,8,9,10,11 The picture is clearer with regard to abnormal placentation; while only 3 studies looked at this potential complication, none saw any increase in the rate of previa or accreta associated with single-layer closure.2,6,9 It is clear that the immediate post-operative recovery after single-layer closure is better

than that after double-layer closure. If we are going to assume anything, it seems reasonable to assume that less inflammation, less infection, less endometritis, less hemorrhage can only improve healing.18 It does not seem reasonable to assume that a single-layer closure automatically risks a woman out of the birth of her choice when the data simply do not support that conclusion, no matter what stories may have been told to the contrary.

References

1 - Tucker JM, Hauth JC, Hodgkins P, Owen J, Winkler CL. Trial of labor after a one- or two-layer closure
of a low transverse uterine incision. Am J Obstet Gynecol 1993 Feb;168(2):545-6

2 - Chapman SJ, Owen J, Hauth JC. One- versus two-layer closure of a low transverse cesarean: the next pregnancy. Obstet Gynecol 1997 Jan;89(1):16-8

3 - Bujold E, Bujold C, Hamilton EF, Harel F, Gauthier RJ. The impact of a single-layer or double-layer
closure on uterine rupture. Am J Obstet Gynecol. 2002 Jun;186(6):1326-30

4 - Muller R, Kohler R, Schultze H, Wolansky D. A modified Sarafoff suture for closure of the uterine wound in Cesarean section. Zentralbl Gynakol 1990;112(13):803-9

5 - Koppel E, Struzyk B, Zbieszczyk J. Cesarean section using single-layer transisthmic uterine sutures. Zentralbl Gynakol 1983;105(23):1522-5

6 - Winkler M, Ruckhaberle KE, Saul S, Forberg J. Clinical experiences with a single layer uterine suture in cesarean section. Zentralbl Gynakol 1986;108(17):1039-45

7 - Lal K, Tsomo P. Comparative study of single layer and conventional closure of uterine incision in cesarean section. Int J Gynaecol Obstet 1988 Dec;27(3):349-52

8 - Kulakov VI, Karimov ZD. A method of single-row repair of the lower segment of the uterus during Cesarean section. Akush Ginekol (Mosk) 1994;(1):25-8

9 - Durnwald C, Mercer B. Uterine rupture, perioperative and perinatal morbidity after single-layer and double-layer closure at cesarean delivery. Am J Obstet Gynecol. 2003 Oct;189(4):925-9.

10 - Tischendorf D. The single-layer uterine suture in cesarean section. A comparative study. Geburtshilfe Frauenheilkd 1987 Feb;47(2):117-20

11 - Enkin MW, Wilkinson C. Single versus two layer suturing for closing the uterine incision at caesarean section. Cochrane Database Syst Rev 2000;(2):CD000192

12 - Stark M, Chavkin Y, Kupfersztain C, Guedj P, Finkel AR. Evaluation of combinations of procedures in cesarean section. Int J Gynaecol Obstet 1995 Mar;48(3):273-6

13 - Iankov M. Single-layer or double-layer suturing of the uterine incision in cesarean section? Akush Ginekol (Sofiia) 1999;38(3):10-3

14 - Franchi M, Ghezzi F, Balestreri D, Beretta P, Maymon E, Miglierina M, Bolis PF. A randomized clinical trial of two surgical techniques for cesarean section. Am J Perinatol 1998;15(10):589-94

15 - Darj E, Nordstrom ML. The Misgav Ladach method for cesarean section compared to the Pfannenstiel method. Acta Obstet Gynecol Scand 1999 Jan;78(1):37-41

16 - Hauth JC, Owen J, Davis RO. Transverse uterine incision closure: one versus two layers. Am J Obstet Gynecol 1992 Oct;167(4 Pt 1):1108-11

17 - Wallin G, Fall O. Modified Joel-Cohen technique for caesarean delivery. Br J Obstet Gynaecol 1999 Mar;106(3):221-6

18 - Jelsema RD, Wittingen JA, Vander Kolk KJ. Continuous, nonlocking, single-layer repair of the low transverse uterine incision. J Reprod Med 1993 May;38(5):393-6