



STOP using instruments to assist with delivery of the head at cesarean

START disengaging the head prior to surgery

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Rates of cesarean delivery in the second stage of labor have increased dramatically over the past few years.¹ Compared with cesarean delivery prior to labor, second-stage labor cesarean is associated with a higher risk to both the mother and the fetus; risks include excessive bleeding, lower uterine segment extensions, injuries to the maternal ureters or bladder, and injury to the fetus.²⁻⁴ The risk is increased even further if the fetal head is deeply impacted in the pelvis. What can we do to avoid and manage such situations?

Anticipate an impacted fetal head

The true incidence of an impacted fetal head at the time of cesarean is not known, although a number of risk factors have been described (TABLE, page 32). Obstetric care providers should be aware of these risk factors and

anticipate the likelihood of a difficult delivery of the fetal head at cesarean.

Options for managing an impacted fetal head at cesarean

Several techniques have been reported in the literature for managing the delivery of a deeply engaged head, including:

Using an assistant to push the fetus's head up using a hand in the vagina ("push" technique). This can cause trauma to the fetus, since the force required to push the fetus up from below is uncontrolled.^{5,6}

The reverse breech extraction ("pull" technique) involves pulling the infant out feet first through the uterine incision.⁷

Use of an instrument. The most common instrument used is a vacuum extractor,⁸ although a number of other devices have been developed, including the Murlless fetal head extractor (an instrument with a hinged shaft and sliding collar lock),⁹ the C-Snorkel impacted fetal head release device (the device's tip contains ventilation ports to facilitate airflow and release of the vacuum/suction created by the impacted fetal head),¹⁰ and the Fetal Pillow (a balloon device inserted in the vagina and inflated with sterile saline to disimpact an engaged fetal head before cesarean delivery).¹¹

While all of these techniques can cause injury to the mother and the fetus, available

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TABLE Risk factors for an impacted fetal head at cesarean delivery

- Failed operative vaginal delivery
- Excessive caput and molding of the fetal head
- Secondary arrest of dilation
- Prolonged second stage of labor
- Occiput-posterior position

data favor use of the reverse breech extraction (pull) technique, since it is associated with fewer maternal risks, including lower rates of uterine incision extension, infection, and postpartum hemorrhage and a shorter operative time.¹²⁻¹⁸

Stop use of vacuum to deliver the fetal head at cesarean

Placement of a vacuum can be effective in assisting with delivery of the fetal head at

cesarean. For this reason, vacuum-assisted deliveries at cesarean are becoming more common. While the rate of complications caused by vacuum extraction of the fetal head at cesarean is not known, injuries have been reported.^{19,20} As such, routine use of vacuum extraction at the time of cesarean delivery cannot be recommended.

Start disengaging the fetal head prior to cesarean

One useful technique in planning a cesarean in the second stage of labor or when an impacted fetal head is anticipated is to disengage the fetal head vaginally prior to skin incision. This can be done in the delivery room or in the operating room immediately prior to surgery with the help of an assistant.

While supporting the patient's legs, the assistant inserts a hand into the vagina and pushes upward on the fetal head with gentle, sustained effort. The assistant should use a

FIGURE Assist from a vaginal hand: The “push” technique



ILLUSTRATION: KIMBERLY MARTENS FOR OBG MANAGEMENT

FAST TRACK

Routine use of vacuum extraction at the time of cesarean delivery cannot be recommended

cupped hand or the palm of the hand while attempting to both elevate and flex the fetal head. It is best to avoid using 1 or 2 fingers to elevate the head, as this may cause excessive pressure at a single point and lead to injury, such as a skull fracture (FIGURE). The assistant should disengage his or her hand only when the operating surgeon is able to reach down and secure the fetal head from above.

Elevating the fetal head prior to skin incision offers 3 major advantages:

1. It avoids the embarrassing situation of having the fetus deliver vaginally before it can be pulled out through the abdominal incision. Although rare, this has been known to happen, because the dense regional anesthesia further relaxes the pelvic floor musculature, leading to flexion and rotation of the fetal head, which then descends and delivers. Performing a final bimanual examination in the operating room after the establishment of surgical level

anesthesia and immediately prior to skin incision will avoid this situation.

2. It elevates the fetal head, thereby creating additional space between the bony pelvis and fetal presenting part for the provider's hand to fit. This helps minimize injury to the fetus and to the maternal soft tissues at the time of cesarean.
3. Lastly, it provides additional information about the extent to which the fetal head is impacted in the pelvis and may influence decision making around the time of cesarean. For example, if the fetal head were deeply impacted in the pelvis and could not be disimpacted vaginally, the surgeon may choose to make a different uterine incision (such as a low vertical hysterotomy), administer a uterine relaxant (an inhaled anesthetic agent or nitric oxide), ask for additional instrumentation, and/or ask an assistant to be ready to elevate the fetal head vaginally should this be necessary.²¹

References

1. Spencer C, Murphy D, Bewley S. Caesarean delivery in the second stage of labour. *BMJ*. 2006;333(7569):613–614.
2. Häger RM, Daltviet AK, Hofoss D, et al. Complications of cesarean deliveries: rates and risk factors. *Am J Obstet Gynecol*. 2004;190(2):428–434.
3. Murphy DJ, Liebling RE, Verity L, Swinger R, Patel R. Early maternal and neonatal morbidity associated with operative delivery in second stage of labour: a cohort study. *Lancet*. 2001;358(9289):1203–1207.
4. Pergialiotis V, Vlachos DG, Rodolakis A, Haidopoulos D, Thomakos N, Vlachos GD. First versus second stage C/S maternal and neonatal morbidity: a systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol*. 2014;175:15–24.
5. Lippert TH. Bimanual delivery of the fetal head at cesarean section with the fetal head in the midcavity. *Arch Gynecol*. 1983;234(1):59–60.
6. Landesman R, Graber EA. Abdominovaginal delivery: modification of the cesarean section operation to facilitate delivery of the impacted head. *Am J Obstet Gynecol*. 1984;148(6):707–710.
7. Fong YF, Arulkumaran S. Breech extraction—an alternative method of delivering a deeply engaged head at cesarean section. *Int J Gynaecol Obstet*. 1997;56(2):183–184.
8. Arad I, Linder N, Bercovici B. Vacuum extraction at cesarean section—neonatal outcome. *J Perinat Med*. 1986;14(2):137–140.
9. Murless BC. Lower-segment cesarean section; a new head extractor. *BMJ*. 1948;1(4564):1234.
10. C-Snorkle impacted fetal head release device. *Clinical Innovations website*. <http://clinicalinnovations.com/portfolio-items/c-snorkel/>. Accessed July 22, 2016.
11. Seal SL, Dey A, Barman SC, Kamilya G, Mukherji J, Onwude JL. Randomized controlled trial of elevation of the fetal head with a fetal pillow during cesarean delivery at full cervical dilatation. *Int J Gynaecol Obstet*. 2016;133(2):178–182.
12. Fasubaa OB, Ezechi OC, Orji EO, et al. Delivery of the impacted head of the fetus at caesarean section after prolonged obstructed labour: a randomised comparative study of two methods. *J Obstet Gynaecol*. 2002;22(4):375–378.
13. Levy R, Chernomoretz T, Appelman Z, Levin D, Or Y, Hagay ZJ. Head pushing versus reverse breech extraction in cases of impacted fetal head during Cesarean section. *Eur J Obstet Gynecol Reprod Biol*. 2005;121(1):24–26.
14. Chopra S, Bagga R, Keepanasseril A, Jain V, Kalra J, Suri V. Disengagement of the deeply engaged fetal head during cesarean section in advanced labor: conventional method versus reverse breech extraction. *Acta Obstet Gynecol Scand*. 2009;88(10):1163–1166.
15. Veisi F, Zangeneh M, Malekshosravi S, Rezavand N. Comparison of “push” and “pull” methods for impacted fetal head extraction during cesarean delivery. *Int J Gynaecol Obstet*. 2012;118(1):4–6.
16. Bastani P, Pourabolghasem S, Abbasalizadeh F, Motvalli L. Comparison of neonatal and maternal outcomes associated with head-pushing and head-pulling methods for impacted fetal head extraction during cesarean delivery. *Int J Gynaecol Obstet*. 2012;118(1):1–3.
17. Waterfall H, Grivell RM, Dodd JM. Techniques for assisting difficult delivery at caesarean section. *Cochrane Database Syst Rev*. 2016;1:CD004944.
18. Jevc YB, Navti OB, Konje JC. Comparison of techniques used to deliver a deeply impacted fetal head at full dilation: a systematic review and meta-analysis. *BJOG*. 2016;123(3):337–345.
19. Clark SL, Vines VL, Belfort MA. Fetal injury associated with routine vacuum use during cesarean delivery. *Am J Obstet Gynecol*. 2008;198(4):e4.
20. Fareeduddin R, Schiffrin BS. Subgaleal hemorrhage after the use of a vacuum extractor during elective cesarean delivery: a case report. *J Reprod Med*. 2008;53(10):809–810.
21. Barbieri RL. Difficult fetal extraction at cesarean delivery: What should you do? *OBG Manag*. 2012;24(1):8–12.



Elevating the fetal head prior to skin incision offers several major advantages