

The second stage of labor

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1 Introduction

During the second stage of labor, the whole tempo and nature of activities surrounding labor tend to change. Although the principles of care throughout labor remain as a continuum, at this time women often become more vulnerable and dependent on the influence of those who assist them. Discussion about alternatives and choices is not easy at this time, and this leaves the caregiver with even more than usual responsibility to safeguard the interests of the mother and baby.

2 Diagnosis of the onset of the second stage of labor

By definition, the second stage of labor, which ends with the birth of the baby, begins when the cervix is fully dilated. This ‘anatomical’ onset may or may not coincide with the onset of the expulsion phase, when the mother begins to feel the urge to bear down. Some women feel the

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urge to bear down before the cervix is fully dilated; others may not feel this urge until well after full cervical dilatation is achieved.

The mother herself may signal the transition into the expulsive phase in words, by action, by a change in the expression on her face, or in the way she squeezes her companion's hand. If the presenting part is visible at the introitus, full cervical dilatation can be assumed. If the mother feels that she wishes to start pushing when the progress of labor gives reason to believe that the cervix may not be fully dilated, cervical dilatation should be checked by vaginal examination. If the cervix is less than 8 cm dilated, the woman should be asked to find the position in which she feels most comfortable and try to resist the urge to push by trying alternatives such as breathing techniques; epidural analgesia may be given if necessary. If there is only a rim of cervix left and the woman has an irresistible urge to push, she may feel better doing so; it is unlikely that any harm will come from this spontaneous pushing before full dilatation, as long as she does not exhaust herself.

When epidural analgesia has been administered for pain relief in labor, the urge to bear down may be reduced, delayed, or abolished. Abdominal palpation is a satisfactory way of gauging descent of the presenting part. Full dilatation can be tentatively diagnosed in this way and confirmed either by the appearance of the presenting part at the vulva or by vaginal examination.

3 Pushing during the second stage of labor

In a study of healthy nulliparous women who had received no formal childbirth education and were allowed to push spontaneously without any directions from those caring for them, three to five relatively brief (4–6 seconds) bearing-down efforts were made with each contraction. The number of bearing-down efforts per contraction increased as the second stage progressed and most were accompanied by the release of air. The minority of bearing-down efforts that were not accompanied by the release of air, were accompanied by very brief periods of breath holding (lasting less than 6 seconds). Despite this pattern of breathing, the average length of the second stage of labor was 45 minutes, and did not exceed 95 minutes for any of the 31 women studied.

The duration of breath holding (less than 6 seconds) in the women who spontaneously used this technique contrasts with the 10–30 seconds duration that is widely advocated for sustained, directed, bearing-down efforts. Although sustained bearing-down

efforts accompanied by breath holding result in shorter second stages of labor, the wisdom of the commonly given advice to make these efforts can be questioned. In addition to respiratory-induced alterations in heart rate and stroke volume, maternal bearing-down efforts, particularly when the mother is lying flat on her back, are associated with compression of the distal aorta and reduced blood flow to the uterus and lower extremities. In combination with sustained maternal breath holding, these effects may compromise fetal oxygenation.

In the published controlled trials comparing different approaches to bearing down in which cord umbilical arterial pH assessments were available, mean cord umbilical arterial pH was lower (more acidotic) in the group in which sustained or early bearing down had been encouraged. Sustained bearing-down efforts also appear to predispose to abnormalities of the fetal heart rate and depressed Apgar score. When bearing down is delayed, the fetal condition should be monitored and the supine position avoided.

In women with epidural analgesia, both the first and second stages of labor are longer, and oxytocin use, malrotation and cesarean sections are more frequent. If the analgesia has not worn off before the second stage of labor, rotational forceps or vacuum deliveries are more commonly used, particularly among women who have been encouraged to bear down relatively early. There is no evidence that a policy of early bearing down has any compensating advantages for either the mother or the baby.

4 Position during the second stage of labor

The use of upright positions such as standing, kneeling, sitting on a specially designed chair, or squatting for delivery is common in many cultures. Despite this, in many hospitals women have been expected to adopt recumbent positions for childbirth. Constraining women to adopt positions that they find awkward or uncomfortable can only be justified if there is good evidence that the policy has important advantages for the health of either the mother or her baby.

Upright posture has been compared with the recumbent position during childbirth in several controlled trials. In most of these, either specially designed obstetric chairs or a back rest, wedge, or birth cushion were used to support the upright position. These studies showed that with upright postures the second stage of labor is shorter, and episodes of severe pain less frequent.

The type of support used influenced the effects of upright posture on perineal trauma and blood loss. In trials of the birth chair or stool, episiotomies were reduced but second degree perineal tears increased, as did estimated blood loss. With the birth cushion, second-degree tears and assisted deliveries were reduced, while episiotomies and postpartum hemorrhage were similar. The increased tendency to postpartum hemorrhage seen in women using birth chairs is probably due to perineal trauma, exacerbated by obstructed venous return. Excessive perineal edema and hemorrhoids have been observed in women who are upright in birth chairs for extended periods of time.

Abnormal fetal heart-rate patterns were observed less frequently among women who used an upright position. This reduction in abnormal fetal heart-rate patterns may be due to the avoidance of the aortocaval compression associated with lying down. In two trials, which compared the supine position to a 15 degree left lateral tilt, babies whose mothers were lying flat on their backs had lower umbilical cord arterial pH values.

Although some birth attendants report that upright positions sometimes caused them inconvenience, there has been a consistently positive response from the women who have used an upright position for birth.

The squatting position is not commonly used for excretion, resting, or other reasons in industrialized societies, and many people find it uncomfortable to maintain for long periods of time. The relative merits and possible disadvantages of the squatting position for birth have not yet been adequately explored. Women should be encouraged to give birth in the position they find most comfortable, with the exception that the untilted supine position should be avoided.

5 Duration of the second stage of labor

The second stage of labor has long been considered to be a time of particular risk to the fetus. Echoes of this view exist today in the widespread policies of imposing arbitrary limits on the length of the second stage.

Statistical associations have been demonstrated between prolonged second stage of labor and obviously undesirable outcomes, such as perinatal mortality, postpartum hemorrhage, puerperal febrile morbidity, and neonatal seizures, as well as with outcomes of less certain significance relating to the acid-base status of the baby at birth. On

their own, these associations are not sufficient justification for concluding that the length of the second stage of labor *per se* is the crucial variable.

Curtailing the length of the second stage of labor by active pushing or operative delivery can modify the decline in fetal pH that tends to occur over the course of labor. However, without some evidence that this policy has a beneficial effect on important infant outcomes, the maternal trauma and occasional fetal trauma resulting from the increased surgical interference can hardly be justified. One trial, available in abstract form only, found a shortened duration of second stage and decreased operative delivery rate with the use of an inflatable abdominal girdle during the second stage.

Decisions about curtailing the second stage of labor should be based on the same principles of monitoring the well-being of mother and baby that apply during the first stage of labor. If the mother's condition is satisfactory, the baby's condition is satisfactory, and there is evidence that progress is occurring with descent of the presenting part, there are no grounds for intervention. A single trial has assessed the use of prophylactic betamimetics with the aim of reducing fetal distress during the second stage; no positive effects were found.

Maternal exhaustion can occur at any time during labor but is more likely to occur during the second stage when the extra effort of pushing is added to the stress of the contractions. If the mother is not unduly distressed and is not actively pushing (particularly when she has epidural analgesia), there is no reason to think that the second stage is any more likely to cause exhaustion than the first stage.

Monitoring the fetal heart using intermittent auscultation may on occasions pose difficulties, as it is sometimes hard to find the fetal heart when the baby moves down into the pelvis. It can be frustrating and uncomfortable for a woman to have people continually trying to listen to her baby's heart, or to have to change her position in order to facilitate fetal auscultation. In these circumstances, electronic fetal monitoring is often more comfortable and less disruptive for the woman.

Failure of the presenting part to descend may be due to inadequate or incoordinate uterine contractions; to malposition or malpresentation of the baby; or to cephalopelvic disproportion. The cause of this failure to progress must be diagnosed and appropriately treated. Malpresentation, or minor degrees of cephalopelvic disproportion, may sometimes be overcome by encouraging the mother to vary her position. Intravenous oxytocin can be used if contractions are

inadequate. Instrumental or manual manipulation, or sometimes cesarean section, may be necessary.

6 Care of the perineum

Reducing the risk of perineal trauma is important, because the consequent discomfort can dominate the experience of early motherhood and result in significant disability during the months and years that follow. This risk can be minimized by intervening to expedite delivery only on the basis of clear maternal or fetal indications, rather than 'because of the clock', and by the use of the vacuum extractor, rather than forceps when instrumental delivery is required (see Chapter 41).

Perineal damage may occur either from spontaneous lacerations or from episiotomy. Although some individual accoucheurs appear to be particularly skilful in assisting birth in a way that minimizes perineal trauma, in most hospitals at least two-thirds of all women giving birth for the first time sustain trauma sufficient to require suturing.

6.1 Guarding and massaging the perineum

The widespread practice of guarding the perineum, with the birth attendant's fingers held against the perineum during contractions, is based on the belief that this practice supports the tissues sufficiently to reduce the risk of spontaneous trauma. This is a reasonable hypothesis, especially if combined with gentle pressure applied to the fetal head to control the speed of crowning, as this is the time that the perineal tissues are most at risk of spontaneous damage. Others believe that a hands-off policy is better (except when necessary). These contrasting policies have been compared in a well-conducted randomized trial of over 5000 women. The primary outcome was perineal pain around the 10th day postpartum, and it was slightly, but significantly, less in the 'hands-on' group. The incidence of perineal trauma was similar in the two groups, as was the condition of the infant.

'Ironing out' (massaging) the perineum as the second stage of labor advances, sometimes with an emollient such as olive oil or the application of a hot pad, is designed to stretch the tissues and reduce the risk of trauma. These techniques have enthusiastic advocates, as well as detractors. The latter suggest that touch may be a disruptive distraction, and that the increase in vascularity and edema in tissues that are already at risk of trauma is counterproductive. In the only controlled

comparison (released only as an abstract to date) no difference was found in the overall risk of perineal trauma, although fewer women in the perineal massage group had a third- or fourth-degree tear.

6.2 Episiotomy

If monitoring during the second stage of labor suggests that either the fetus or the mother has become distressed, or that progress has ceased, it may be necessary to hasten delivery, by episiotomy, instrumental delivery, or both. More controversial is the question of routine, or liberal use of episiotomy for less overriding indications.

Although episiotomy has become one of the most commonly performed surgical procedures in the world, it was introduced without strong scientific evidence of its effectiveness. The suggested beneficial effects of episiotomy are: a reduction in the likelihood of third-degree tears; preservation of the pelvic floor and perineal muscle leading to improved sexual function and a reduced risk of fecal and/or urinary incontinence; reduced risk of shoulder dystocia; easier repair and better healing of a straight, clean incision rather than a laceration; for the baby, reduced asphyxia, cranial trauma, cerebral hemorrhage, and mental retardation. On the other hand, a number of adverse effects of episiotomy have been suggested. These include: the cutting of, or extension into, the anal sphincter or rectum; unsatisfactory anatomic results, such as skin tags, asymmetry, or excessive narrowing of the introitus; vaginal prolapse, rectovaginal or anal fistulas; increased blood loss and hematoma; pain and edema; infection and dehiscence; and sexual dysfunction.

Liberal use of an operation with the risks described above could only be justified by evidence that such use confers worthwhile benefits. There is no evidence to support the postulated benefits of liberal use of episiotomy. Controlled trials show that restricted use of episiotomy results in less risk of posterior perineal trauma, less need for suturing perineal trauma, fewer healing complications, and no differences in the risk of severe vaginal or perineal trauma, postpartum perineal pain, dyspareunia, or urinary incontinence. The only disadvantage shown in the restrictive use of episiotomy is an increased risk of anterior perineal trauma. These results are similar for both mediolateral and midline episiotomy.

There is no evidence to support the suggestion that liberal use of episiotomy minimizes trauma to the fetal head. Data from the randomized trials show similar distributions of Apgar scores and rates of admission to the special care nursery.

Liberal and restricted use of episiotomy are associated with contrasting patterns of trauma: liberal use is associated with a lower frequency of anterior vaginal and labial tears. This raises the possibility that episiotomy may have a more specific protective effect on the tissues around the bladder neck. There is no good evidence, however, that more liberal use of episiotomy is protective against urinary incontinence. In the 3-year follow-up of a comparison of liberal with restricted use of episiotomy, rates and severity of incontinence were similar in the two trial groups.

6.3 Technique of episiotomy

Episiotomies are sometimes performed using scissors, sometimes with a scalpel. Those who favor scissors maintain that they are less likely to damage the presenting part of the baby and more likely to promote hemostasis in the wound edges because of their crushing as well as cutting action. Those who favor the scalpel say that it minimizes trauma and is thus followed by better healing of the perineal wound. There are no data on which to base any judgements about the validity of these claims.

The question of whether midline episiotomy results in a better outcome than mediolateral episiotomy has not been satisfactorily answered. The suggested advantages of performing a midline episiotomy are: better healing with improved appearance of the scar, and better future sexual function. Those not favoring the use of the midline method point out that it is associated with higher rates of extension of the episiotomy and consequently an increased risk of serious perineal trauma. In one trial, midline episiotomy was associated with less bruising, more third-degree perineal lacerations, and earlier resumption of sexual intercourse, but neither this nor a subsequent trial was methodologically sound enough to draw reliable conclusions. Well-controlled research to assess the short- and long-term advantages and disadvantages of midline and mediolateral episiotomies is long overdue.

7 Birth

Women may choose from a variety of positions for giving birth, and may change position frequently, if they are encouraged to discover for themselves which position is most comfortable for them. There is no justification for requiring, or actively encouraging, a supine or litho-

tomy position during childbirth; these positions are often especially painful and disruptive at this point. Women who choose to lie down for delivery often find a lateral position more comfortable.

A woman will often depend on the midwife or doctor's guidance to moderate her pushing effort, to allow an unhurried, gentle delivery of the head. This can be achieved by interspersing short pushing efforts with periods of panting, thus giving the tissues time to relax and stretch under pressure. Using this approach, several contractions may occur before the head crowns and is delivered.

After delivery of the head, the shoulders rotate internally. If the umbilical cord is tightly wound around the baby's neck, it may be possible to loosen it, then loop it over the baby's head. If necessary, it can be clamped and severed. Once rotation is complete, the shoulders are delivered one at a time to reduce the risk of perineal trauma. When the mother is in the semi-recumbent position, the anterior shoulder may deliver first; in the squatting or kneeling position, the posterior shoulder may be released first. The mother may then wish to grasp her baby and complete the rest of the delivery herself.

Difficulty with delivery of the shoulders is rare following spontaneous birth of the head. Delivery of the shoulders should not be attempted until they have rotated into the anteroposterior axis. Posterior traction on the head, combined with the mother's expulsive efforts, is usually sufficient to effect delivery of the anterior shoulder. The accoucheur should be aware of techniques to overcome the problem of shoulder dystocia on the rare occasions in which it does occur. These include wide abduction of the mother's thighs and complete flexion of her hips; manual rotation of the posterior shoulder anteriorly; and sustained pressure exerted by an assistant directly above the pubic bone.

8 Conclusions

There are no data to support a policy of directed pushing during the second stage of labor, and some evidence to suggest that it may be harmful. The practice should be abandoned.

Similarly, there is no evidence to justify forcing women to lie flat during the second stage of labor. With some reservations, the data tend to support the use of upright positions. There is a tendency for recumbency to lengthen the second stage of labor, to reduce the incidence of spontaneous births, to increase the incidence of abnormal fetal

heart-rate patterns, and to reduce umbilical cord blood pH. On the other hand, at least some of the birthing chairs that have been introduced during recent years appear to predispose to perineal edema and venous engorgement which, in conjunction with perineal trauma, can result in increased loss of blood. Use of a birthing chair is not, however, the only way of adopting an upright position during labor. The mother should be encouraged to use the position that she prefers.

There is no evidence to suggest that, when the second stage of labor is progressing and the condition of both mother and fetus is satisfactory, the imposition of any upper arbitrary limit on its duration is justified. Such limits should be discarded.

There is some evidence to support the practices of guarding the perineum, but none to support claims that liberal use of episiotomy reduces the risk of severe perineal trauma, improves perineal healing, prevents fetal trauma, or reduces the risk of urinary stress incontinence after delivery. Episiotomy should be used only to relieve fetal or maternal distress, or to achieve adequate progress when it is the perineum that is responsible for lack of progress.

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