

EFFECTS OF PUSHING TECHNIQUES IN BIRTH ON MOTHER AND FETUS

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Background: The Valsalva pushing technique is used routinely in the second stage of labor in many countries, and it is accepted as standard obstetric management in practice. The purpose of this study was to determine the effects of pushing techniques on mother and fetus in birth in this setting.

Methods: This randomized study was conducted between 2018-2019 Obstetric-Gynecological University Hospital "Koço Gliozeni", Tirana, Albania. One hundred low-risk primiparas between 38 and 42 weeks' gestation, who expected a spontaneous vaginal delivery, were randomized to either a spontaneous pushing group or a Valsalva-type pushing group. Spontaneous pushing women were informed during the first stage of labor about spontaneous pushing technique (open glottis pushing while breathing out) and were supported in pushing spontaneously in the second stage of labor. Similarly, Valsalva pushing women were informed during the first stage of labor about the Valsalva pushing technique (closed glottis pushing while holding their breath) and were supported in using Valsalva pushing in the second stage of labor. Perineal tears, postpartum hemorrhage, and hemoglobin levels were evaluated in mothers; and umbilical artery pH, PO₂ (mmHg), and PCO₂ (mmHg) levels and Apgar scores at 1 and 5 minutes were evaluated in newborns in both groups. **Results:** No significant differences were found between the two groups in their demographics, incidence of nonreassuring fetal surveillance patterns, or use of oxytocin. The second stage of labor and duration of the expulsion phase were significantly longer with Valsalva-type pushing. Differences in the incidence of episiotomy, perineal tears, or postpartum hemorrhage were not significant between the groups. The baby fared better with spontaneous pushing, with higher 1- and 5-minute Apgar scores, and higher umbilical cord pH and PO₂ levels. After the birth, women expressed greater satisfaction with spontaneous pushing.

Conclusions: Educating women about the spontaneous pushing technique in the first stage of labor and providing support for spontaneous pushing in the second stage result in a shorter second stage without interventions and in improved newborn outcomes. Women also stated that they pushed more effectively with the spontaneous pushing technique.

Key words: second stage of labor, pushing techniques, spontaneous pushing, Valsalva-type pushing, experience of birth

Introduction

Different approaches to managing the second stage of labor are apparent in the medical and nursing literature [1,2]. Two basic pushing techniques have been described, one of which is the “Valsalva Maneuver” [closed glottis pushing while holding the breath] and the other is “spontaneous pushing” [open glottis pushing while breathing out]. Several studies suggest

that spontaneous pushing causes fewer changes in the fetal heart rate, increases the umbilical cord arterial pH, and results in less damage to the birth canal [3,4] and to the perineal and pelvic floor muscles [5] compared with Valsalva-type pushing. The effectiveness of pushing techniques has been evaluated in women who used epidural analgesia in the second stage of labor with mixed results [6–10]. Researchers observed that delivering the fetus gently through the stretched and thin perineum in women who began pushing when they felt the strong involuntary desire to bear down was associated with more effective efforts, less maternal fatigue, and better umbilical cord gases [2]. Earlier, Beynon suggested that women should “follow their own inclination in the second stage,” push only when they felt the urge to bear down, and only push strongly immediately after complete cervical dilatation [11]. In practice, these women were observed to push only at the peak of contractions and only for about 10 to 12 seconds. She reported an increase in episiotomy use and perineal tears when women were encouraged to push strongly in the early second stage, and an increased need for forceps, which Beynon attributed to the rapid stretching of the vaginal tissues and perineal muscles resulting from the limited gradual descent of the fetal head [11]. The stretching and force on the vaginal wall and supportive structures were also thought to cause urinary stress incontinence or perineal trauma in the future [11,12]. The Valsalva pushing technique is used routinely in the second stage of labor and is accepted as standard obstetric management in practice, even though no research has been conducted in the country on the effects of pushing techniques. The present study was planned to determine the effects of pushing techniques on mother and fetus in birth. It aimed to establish whether the spontaneous pushing technique decreased perineal trauma and rate of labor interventions and increased newborn well-being and women’s satisfaction with birth when compared with the Valsalva pushing technique.

Methods

This randomized study was conducted between 2018-2019 Obstetric-Gynecological University Hospital "Koço Gliozheni", Tirana, Albania. One hundred low-risk primiparas between 38 and 42 weeks' gestation, who expected a spontaneous vaginal delivery, were randomized to either a spontaneous pushing group or a Valsalva-type pushing group. Spontaneous pushing women were informed during the first stage of labor about spontaneous pushing technique (open glottis pushing while breathing out) and were supported in pushing spontaneously in the second stage of labor. Similarly, Valsalva pushing women were informed during the first stage of labor about the Valsalva pushing technique (closed glottis pushing while holding their breath) and were supported in using Valsalva pushing in the second stage of labor. Perineal tears, postpartum

hemorrhage, and hemoglobin levels were evaluated in mothers; and umbilical artery pH, PO₂ (mmHg), and PCO₂ (mmHg) levels and Apgar scores at 1 and 5 minutes were evaluated in newborns in both groups.

Second stage of labor was defined as the stage of labor from full dilatation (10 cm) of the cervix until the end of the delivery. The expulsion phase began when the fetal head became visible in the vulva and continued until birth. Women were informed about the second stage and the pushing techniques during the latent phase of the first stage of labor. Pushing began in both groups with full dilatation of the cervix, when uterine contractions became intense, and the fetal head had completed its rotation and descended to at least the +1 level in the pelvis. Women in the spontaneous pushing group were encouraged and supported to push spontaneously in the second stage of labor, bearing down in response to contractions. Women in the Valsalva pushing group were encouraged and supported in using Valsalva-type pushing in the second stage of labor. Continuous electronic fetal monitoring was used to monitor nonreassuring fetal surveillance patterns. As was local practice, all women delivered in the lithotomy position in the expulsion phase of the birth. After clamping the umbilical cord, blood specimens were obtained from the umbilical artery to determine the pH, PO₂ (mmHg), and PCO₂ (mmHg) levels. Newborn Apgar scores were evaluated at 1 and 5 minutes after birth. Postpartum hemorrhage was evaluated by using 1-hourly pad controls, and women's hemoglobin levels were checked before and after delivery. Women were also examined for perineal or cervical tears.

Results and Discussion

The average age of study women was 22.9 ± 3 years. No significant differences were found between the two groups in the incidence of nonreassuring fetal surveillance patterns or in the use of oxygen or oxytocin. Vacuum extraction was not used in either group. The average duration of the second stage of labor in the Valsalva pushing group was longer than that in the spontaneous pushing group and the difference between groups was statistically significant ($p < 0.05$). The average duration of the expulsion phase in Valsalva pushing group (14.8 ± 7.5 min) was longer than that in the spontaneous pushing group (9.6 ± 5.5 min) and the difference between groups was statistically significant ($p < 0.001$) (Table 1). Differences in the incidence of episiotomy and perineal tears were not significant between the groups.

Table 1: Duration of the Second Stage and Expulsion Phase in Labor

Duration	Spontaneous Pushing	Valsalva Pushing	t	p
	(n = 50)	(n = 50)		
	Mean ± SD	Mean ± SD		
Second stage (min)	40.8 ± 19.1	50.1 ± 26.3	2.028	0.04
Expulsion phase (min)	9.6 ± 5.5	14.8 ± 7.5	3.935	<0.01

The amount of postpartum hemorrhage was small in 50 percent and moderate in 48 percent of women in the spontaneous pushing group and small in 40 percent and moderate in 58 percent of women in the Valsalva pushing group. Postpartum hemorrhage was similar in both groups ($p > 0.05$). No intervention was used to prevent postpartum hemorrhage in most study women (spontaneous group 92% and Valsalva group 88%). Interventions to prevent hemorrhage were similar in both groups ($p > 0.05$). The baby fared better with spontaneous pushing compared with Valsalva pushing, with higher 1- and 5-minute Apgar scores, and higher umbilical cord pH and Po₂ levels. Apgar scores at 1 and 5 minutes were reanalyzed using a cutoff score of “7”. The Apgar score at 1 minute in the spontaneous pushing group was significantly higher than in the Valsalva pushing group ($p < 0.01$) but Apgar scores at 5 minutes were not significantly different between groups. Umbilical cord arterial pH in the spontaneous pushing group was higher than in the Valsalva pushing group and the difference between groups was statistically significant. No significant difference was found in umbilical cord arterial PO₂ and PCO₂ levels between groups. When umbilical artery pH levels were reanalyzed using a cutoff score of 7.2, no significant difference was found between groups.

The logistic regression analyses showed no significant relationship between the pushing techniques and the duration of the second stage of labor, fundal pressure, and Apgar scores. In another logistic regression analysis to determine the independent variables related to the pushing techniques, we prepared a model that included the duration of the second stage of labor, the duration of expulsion phase, the use of fundal pressure, umbilical arterial pH, and Apgar scores at 1 and 5 minutes. However, no significant relationship was found. When we reevaluated the Apgar scores and umbilical cord arterial pH levels according to cutoff scores of above or below Apgar score 7, very few cases under the cutoff were found in either group. Women's average total score for the pushing technique was higher in the spontaneous pushing group (53.2 ± 6.1) than in the Valsalva pushing group (42.7 ± 10.7). The difference in the

pushing scores was found to be statistically significant ($p < 0.01$). Women in the spontaneous pushing group reported that they had fewer problems, felt that they pushed more effectively, and were more satisfied with the pushing technique they had used when compared with the Valsalva pushing group.

The duration of the second stage of labor and expulsion were shorter, and 1- and 5-minute Apgar scores and umbilical cord arterial pH levels were significantly higher in women who pushed spontaneously in the second stage of labor. In our study, in contrast, the durations of both the second stage and the expulsion phase were significantly shorter in the spontaneous pushing group than in the Valsalva pushing group. Spontaneous pushing begins with the stimulation of the Ferguson reflex and women's strong urge to push. Women push involuntarily three to five times during each contraction. Spontaneous pushing enables a gradual rather than a rapid dilatation in the cervix and birth canal, facilitating the delivery of the fetus gently through the stretched and thin perineum. The integrity of the perineum can be protected in this way [5,11,12].

Conclusions

Educating women about the spontaneous pushing technique in the first stage of labor and providing support for spontaneous pushing in the second stage result in a shorter second stage without interventions and in improved newborn outcomes. Women stated that they had fewer problems, were more satisfied, and pushed more effectively with the spontaneous pushing technique compared with women who used the Valsalva pushing technique.

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